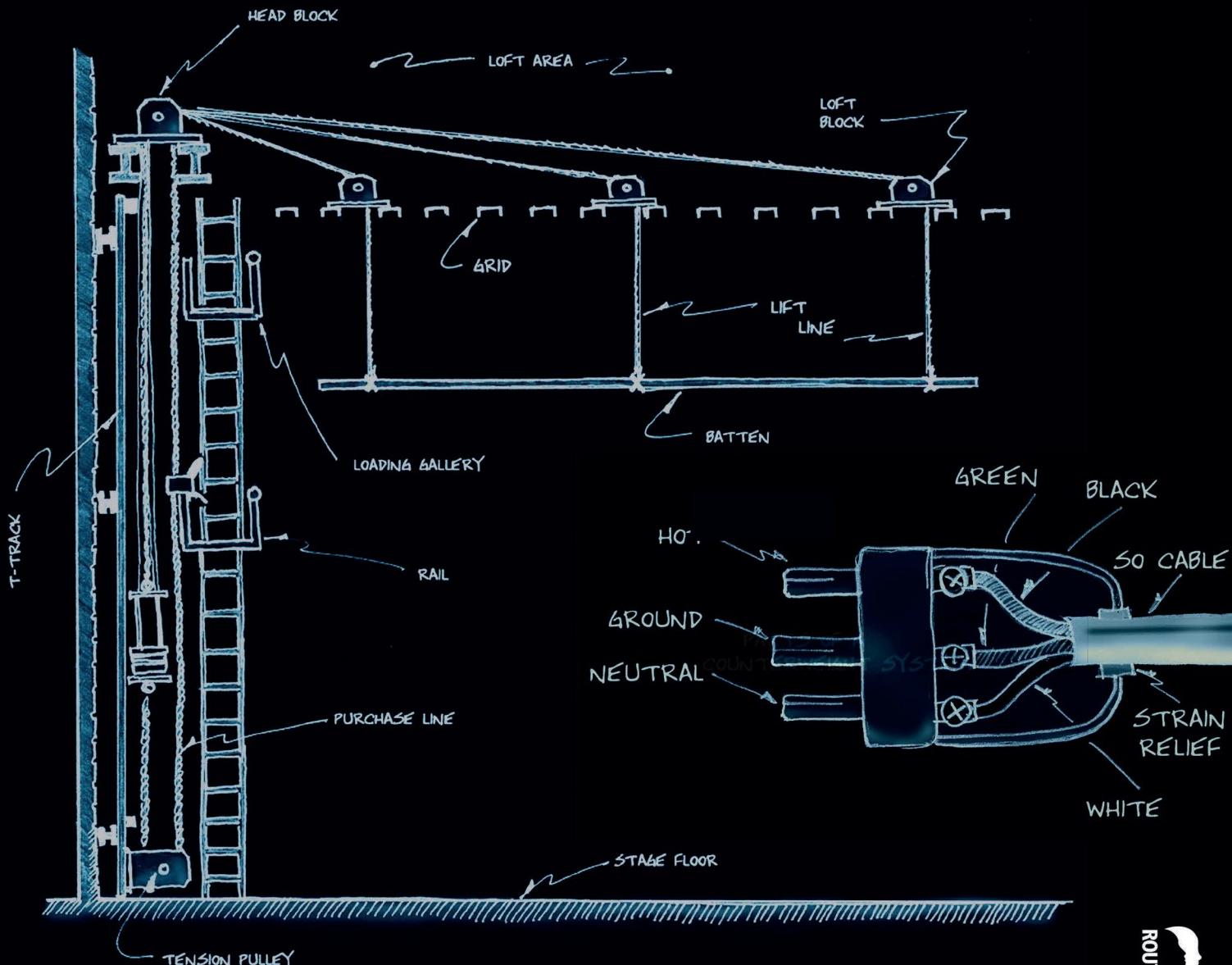
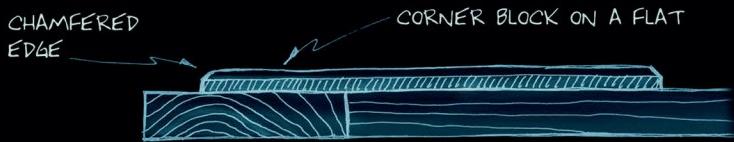
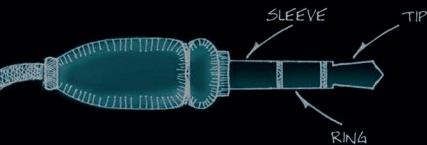


Illustrated THEATRE Production Guide



Fourth Edition

ILLUSTRATED THEATRE PRODUCTION GUIDE

Now in its fourth edition, *Illustrated Theatre Production Guide* delivers a step-by-step approach to the most prevalent and established theatre production practices, focusing on essential issues related to the construction of wooden, fabric, plastic, and metal scenery used on the stage.

Offering techniques and best-practice methods from experienced industry experts, this book allows readers to create a foundation on which to build a successful and resourceful career behind the scenes in theatre production. The new edition has been fully updated to include the latest technology and current practices, with four new chapters on Safety, Automation, Digital Fabrication, and the Production Process, and an emphasis on inclusivity and gender-neutral language.

A must-have resource for both the community theatre worker who must be a jack of all trades and the student who needs to learn the fundamentals on his or her own, *Illustrated Theatre Production Guide* covers all the necessities of theatre production through detailed lessons and hundreds of drawings.

The book also includes access to a companion website featuring instruction videos, tips for an eco-friendly production, and additional images and resources.

Zachary Stribling received his BFA in Technical Theatre from the University of Evansville and an MFA in Technical Production from Florida State University. Working in commercial, industrial, and educational theatre for over 25 years, he has served as Technical Director for the Utah Shakespeare Festival, Faculty Technical Director at the University of Central Florida, and Visiting Assistant Professor of Technical Production at the Florida State University. He is currently a Senior Lecturer, Production Manager, and Technical Director at the University of Kentucky. In 2015 he co-authored the first edition of *The Technical Director's Toolkit* along with his dear friend Richard Girtain.

John Holloway earned an MFA from the Dallas Theater Center in 1980, and is now Professor Emeritus from the University of Kentucky, where he served as Technical Director/Designer for 35 years. He was President of IATSE Local 346 for two terms, and toured with several different Broadway shows.



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

ILLUSTRATED THEATRE PRODUCTION GUIDE

FOURTH EDITION

**ZACHARY STRIBLING
AND JOHN HOLLOWAY**

Fourth edition published 2021
by Routledge
52 Vanderbilt Avenue, New York, NY 10017

and by Routledge
2 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

Routledge is an imprint of the Taylor & Francis Group, an Informa business

© 2021 Taylor & Francis

The right of Zachary Stribling and John Holloway to be identified as authors of this work has been asserted by them in accordance with sections 77 and 78 of the Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publishers.

Trademark notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

First edition published by Focal Press 2002

Third edition published by Focal Press 2014

Library of Congress Cataloging-in-Publication Data

Names: Stribling, Zachary, author. | Holloway, John, 1954– author.
Title: Illustrated theatre production guide / Zachary Stribling and John Holloway.
Description: Fourth edition. | New York, NY : Routledge, 2021. | Includes index.
Identifiers: LCCN 2020015483 (print) | LCCN 2020015484 (ebook) |

ISBN 9780367152024 (hardback) | ISBN 9780367152031 (paperback) |

ISBN 9781003034575 (ebook)

Subjects: LCSH: Stage management. | Theaters—Stage-setting and scenery.

Classification: LCC PN2085 .H64 2021 (print) | LCC PN2085 (ebook) |

DDC 792.02/32—dc23

LC record available at <https://lccn.loc.gov/2020015483>

LC ebook record available at <https://lccn.loc.gov/2020015484>

ISBN: 978-0-367-15202-4 (hbk)

ISBN: 978-0-367-15203-1 (pbk)

ISBN: 978-1-003-03457-5 (ebk)

Typeset in Adobe Garamond and Frutiger

by Apex CoVantage, LLC

Visit the companion website at: www.focalpress.com/cw/holloway

CONTENTS

<i>Preface</i>	vii
<i>Acknowledgments</i>	viii
<u>SECTION ONE—PEOPLE AND PROCESS</u>	1
1 Working in the Theatre	3
2 The Production Process	17
<u>SECTION TWO—THE THEATRE AND ITS EQUIPMENT</u>	23
3 Thrust Theatres	25
4 Black Box and Experimental Theatres	29
5 Proscenium Theatres	33
6 Curtains and Backdrops	40
7 Ropes and Knots	54
8 Theatre Rigging	61
9 Arena Rigging	75
<u>SECTION THREE—THE SCENE SHOP AND ITS EQUIPMENT</u>	85
10 Shop Safety and PPE	87
11 Hand Tools	93
12 Shop Equipment	114
13 Building Materials	132
14 Hardware and Other Essential Theatre Supplies	147
<u>SECTION FOUR—BUILDING SCENERY</u>	179
15 Flats	181
16 Platforms and Decking	209
17 Stairs	225

18	Metal Construction	238
19	Construction Documents	260
20	Digital Fabrication	271
21	Scenic Machinery and Automation	277
<u>SECTION FIVE—STAGE LIGHTING</u>		287
22	Electrical Theory	289
23	Power Distribution	306
24	Lighting Control	319
25	Photometrics and Instrumentation	333
26	Hanging and Focusing	355
<u>SECTION SIX—AUDIO AND VIDEO</u>		369
27	Audio Theory	371
28	Sound Reinforcement	378
29	Digital Audio Files	390
30	Video Projection for the Stage	401
<i>Appendix</i>		413
<i>Index</i>		421

PREFACE TO THE FOURTH EDITION

ALMOST 20 YEARS ago this book began life as a “shop cookbook” that had lots of information about the techniques for building wooden scenery that John learned over decades of doing just that. At the same time he worked as an IATSE stagehand. Sometimes that was on tour with Broadway musicals, and sometimes through IATSE Local 346 in Lexington, Kentucky. Working in commercial theatre was quite a learning experience. If you want to know how to build scenery that functions well in the backstage environment, it really helps to spend some time “under the blue lights” backstage, and even more time moving scenery in and out of trucks. Good times were had doing all of that, it was so much fun.

At the same time Zak was coming out of graduate school at FSU, working professionally in the summers at a major regional theatre, and beginning his teaching career. Since then, John has spent his time designing more, and we have both invested a great deal of time learning emerging technologies. This book has changed into something much more inclusive about theatre production in general, which the title always promised, and fulfills more with every edition. We still don’t know all that much about building costumes, though Zak did begin his career studying costuming and costume design, but we have learned a huge amount about electronics, automation, computers, and projectors. We are very proud of how inclusive the book has become. It is now divided into six sections that cover different aspects of working in theatre production. Check out the chapters “The Production Process,” “Safety and PPE,” “Digital Fabrication” and “Automation.” They are brand new additions to this edition, and necessary in updating and rounding out this text. Every chapter has been combed over, and practices update to reflect current industry practices. Many thanks to our professional associates and the many reviewers who helped guide us in these updates.

Both of us would like to express our mutual gratitude for this fruitful collaboration and the valuable years during which we got to work alongside each other. There are so many people who have helped along the way with this text, and many thanks go out to the innumerable artists and students with whom we have had the pleasure to grow alongside over our careers. We would like to express our gratitude to Hideaki Tsutsui for helping us update the lighting sections of this text. We are of course most thankful for our spouses Patty and Judy, who have supported us throughout this endeavor and make our lives rich beyond measure. Finally, we are also thankful for you the readers, for continuing the long-held traditions of stagecraft and innovating those practices for the future.

ACKNOWLEDGMENTS

THE AUTHORS OF this edition would like to express their mutual gratitude for this collaboration and to the innumerable artists and students with whom they have had the pleasure to grow along side with over their careers. They are of course most thankful for their spouses Patty and Judy, who have supported them throughout this endeavor and make their lives rich beyond measure. Special thanks to those artists and companies who provided visual examples of their work for this text, including but not limited to Tony Hardin, Latiana Gourzong, Richard Girtain, Colin Campbell, Aaron Karpoff, Aaron Wilson, Eben Alguire, Ryan Ponsell, and the fine people at Inter-America Stage and Creative Connors. Finally, they are also thankful for you the readers, for continuing the long-held traditions of stagecraft and innovating those practices for the future.

THE STAGE CARPENTER.

WRITTEN FOR THE NEW YORK CLIPPER.
BY MONROE H. ROSENFELD.

He wanders up, he wanders down,
A phantom on the scene;
He talks to none, he does his work
With countenance serene;
Although his purse is never fat,
'Tis like his figure—lean.

What is there he cannot construct?
An elephant to him
Is but a simple plight, or eke
A dragon fierce and grim,
And golden goblets all begemmed,
That never will grow dim.

He builds a ship, a paradise,
Where angels music speak—
Bright angels with a salary
Of just five bones a week;
And yet, in spite of genius,
His actions are so meek.

Tanks are his special workmanship,
And buzz saws meet his line;
And cottages and other things—
At these he's very fine;
And he can make a thunder cloud,
And moons that move and shine.

But who applauds his mystic art?
The bass drum wouldn't nod
At him, while on his daily rounds
The carpenter doth plod;
The manager? He knows him not—
A stranger in the fold.

I wonder if he ever thinks
Who cleverly will make
A little box for him, some day,
That will not be a fake,
When Life's last scene on him shall close
And Heaven's joy awake!



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

SECTION ONE

PEOPLE AND PROCESS

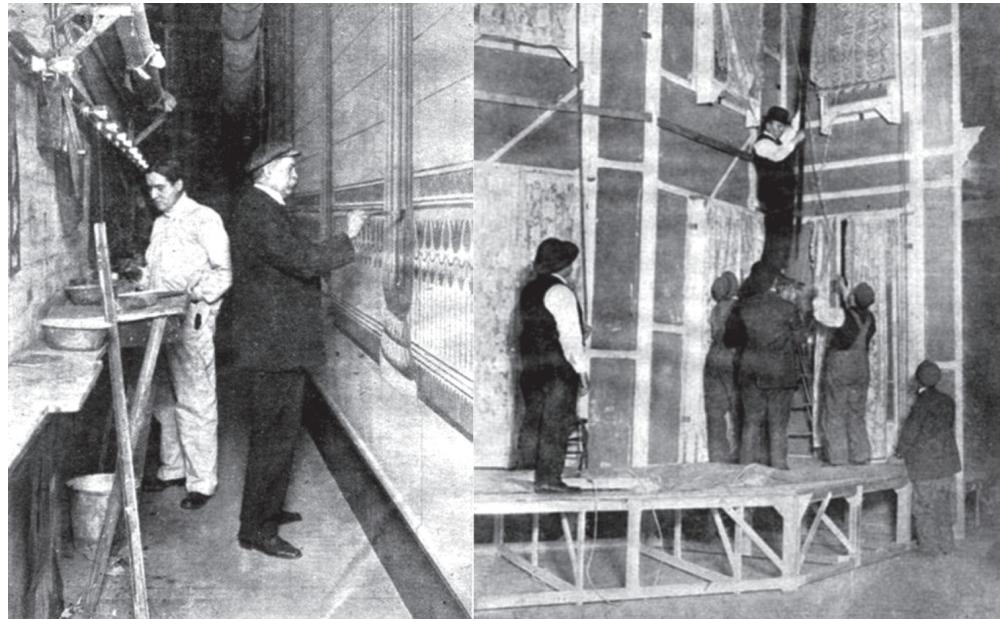


Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

WORKING IN THE THEATRE



PHOTOS COURTESY OF WESTERN NEW YORK HERITAGE

EARLY STAGEHANDS AT THE TECK THEATRE IN BUFFALO

THESE FELLOWS SEEM AWFULLY WELL DRESSED BY MODERN STANDARDS,
BUT PERHAPS THEY KNEW IT WAS PICTURE DAY.

WHAT KINDS OF theatre jobs are there? If you were to ask a person on the street that question you would probably get an answer like, "Well, there are actors, of course, and directors, and the authors who write the plays." A more detailed answer from someone who enjoys theatre might include choreographers and dancers and people who design scenery or lights. Those occupations are all very visible to the public, especially the actors, because they are what theatergoers actually experience when they go to see a show.

Of course, we all know there is much more to it than that. Actors might get together in a *storefront theatre* (one with very limited technical facilities) and put on their favorite play with a small budget, but finding a larger audience generally requires more advanced visual support with lighting, scenery, props, costumes and the aural element of sound. That is where stage *production* comes in. Production is a catchall term that means all of the elements of producing a play that are not acting, directing, and so forth. You might think of excluding designers as well, although many people would not, because designers are involved in the creative process

of imagineering a play. The term production as used in this book mostly refers to the work of carpenters, painters, electricians, stagehands, and the like as they find ways to bring the creative experience to life.

All these production personnel should be considered artisans. Artisans are people who use a creative approach to craft objects for everyday life. Their work is both utilitarian and artistic at the same time. This is the world where scenery and props for a play exist. They should be wonderful and fun, designed and built with creativity and craft, but they also need to function for the action of the play, every night and without fail.

The production field is much wider than just theatre, especially when it comes to lighting and sound. There are many other uses for the same skills, in what is often generically referred to as the entertainment business. A *stagehand* who sets up lighting for a play uses the same general skill set as one who installs the lighting for a concert. Theatre-type lights are used in somewhat predictable places such as TV studios, library lecture halls, churches, and schools, but also in venues that you might not suspect like museums and shopping malls. Someone has to install and maintain that equipment, which means more jobs for theatre production. Most of the people who do this type of work have a theatre school background.

Generally speaking there are three different types of theatre work environments: Schools, Regional Theatres, and Commercial. They are organized in somewhat different ways but with some obvious overlapping. *Commercial theatre* is just that, a theatre engaged in commerce, or money making. Broadway theatres and the tours they spawn are commercial theatre, a market that also exists in a few other large cities outside of NYC. A corporation is formed to produce a certain work, and only that work. This serves as a financial barrier to protect assets in case the show is not as big a hit as everyone hopes it will be. Commercial theatre groups last only as long as the show does, and when it ends so too does the corporation. Most of us consider this to be the “big time” of the theatre world and since lots of money is in play, a system of paying workers fairly is required. That’s where unions like *USA* (United Scenic Artists: designers) *IATSE* (International Alliance of Theatrical Stage Employees: stagehands) and *Actors’ Equity Association* (actors and stage managers) are a must. A union of some sort covers every aspect of a Broadway show from the director to the ticket takers.

Regional theatres come in many different sizes and shapes; some of them exist under the *LORT* (League of Regional Theatres) contract with Actor’s Equity and tend to be the larger ones. But many smaller regional theatres do not have such a contract, undoubtedly the lion’s share of the total number. Most exist as *not for profits*, meaning that they get tax breaks because they exist for the public good. Typically, a regional theatre exists as an ongoing enterprise, such that they have a new *season* of plays each year and a permanent facility.

Some of them produce plays year-round, some only in the summer, and some only in the other months of the year. The head of the theatre may be called its *Managing Director* to distinguish the position from the director of an individual show. The title *Artistic Director* is also popular. Because they have a season of plays, regional theatres tend to have a *company* of actors who take turns being in the different shows. There are staff designers who do most of the design work, and shops that turn out the required scenery, costumes, and lighting.

A not-for-profit organization is often referred to as a *501 (c) 3*. That designation comes from the numbering system for federal statutes, meaning that the statute is published in that manner. Part 501 generally covers federal tax exemptions, section c lists types of exempt organizations and subsection 3 talks about libraries, schools, arts organizations and so forth. To qualify as a *501 (c) 3* the organization must follow fairly complicated procedures including having a board of directors, elections, and accounting procedures, much like any other corporation. It’s not all that easy to comply, but makes your organization much more attractive to donors who can then claim a tax credit.

One very important job in a regional theatre that doesn’t usually exist in commercial theatre is the *Technical Director*. The job of “TD” generally requires the oversight of the shop where the scenery is built, but can include many other tasks such as scheduling and budgeting. In some theatre companies, the scheduling and budgeting are handled instead by a *Production Manager*, who is responsible for all the shows in a season rather than just one. In a very small group with a limited staff, the TD may be the only other paid staff member other than the managing director, such as in a *community theatre*. The term “community theatre” is often used to describe a group that exists because people in the community want to act in plays and are willing to do themselves whatever it takes to make that happen. Although sometimes seen as a pejorative inside joke in the theatre world, many of them are actually quite good, some with lavish facilities and well-paid staff. Professional shops that service commercial theatres in New York use the title TD for an in-house person who oversees the building of a show, just like in a regional theatre. In television, the technical director manages other technicians on a crew, especially if it’s a live show like news or a game show.

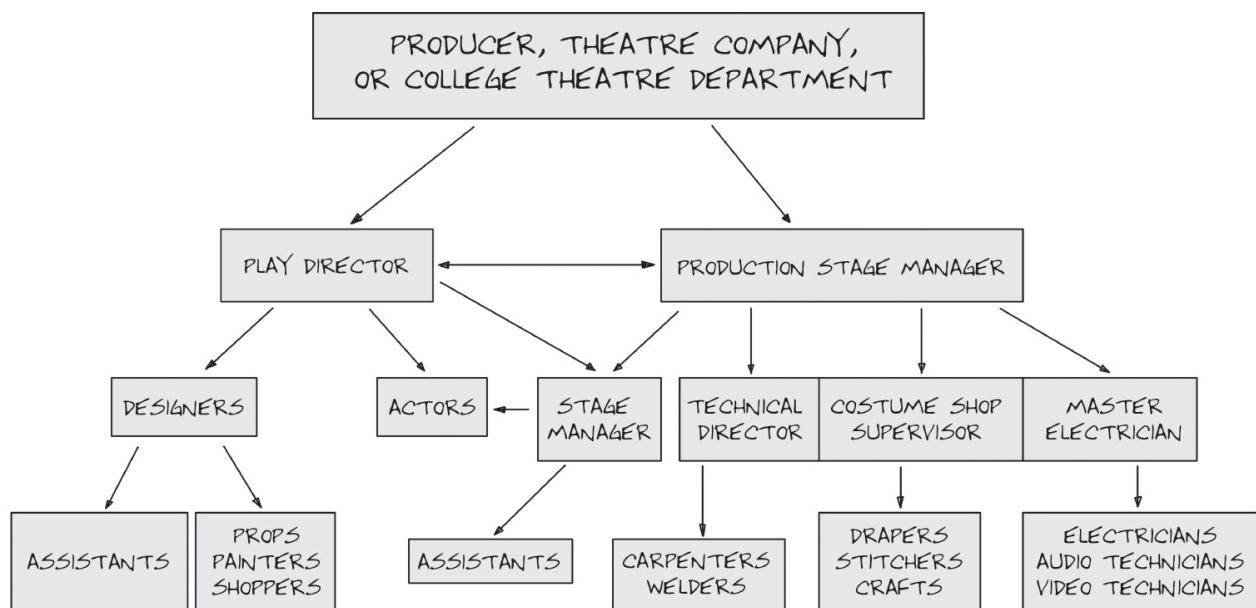
A regional theatre is sometimes called a *stock company*, which is related to the idea of keeping things in stock. Long ago this meant the roster of plays that a specific company could do on demand. These days you might think of it more in terms of physical things used

in production, such as *stock scenery*. Regional companies tend to save scenery, props, costumes, etc., in order to reuse them for another production, or perhaps the same show will be run again if it was popular enough. Some theatres save and reuse lots of stuff. Some theatres save very little. Things like platforms, escape stairs, curtains, and so forth are so generic that it only makes sense to reuse them in order to keep costs down. Lighting, sound, and projection equipment are obvious things to save. In commercial theatre all of those things are instead rented. This book often discusses the pros and cons of what should constitute stock items.

The school theatre environment is much more closely aligned with what you would expect from a regional theatre, rather than commercial theatre. Schools are the original not for profits, especially if you consider a state-owned institution. The faculty of the school is the producer of the plays, and generally has more say over governance than in a regional theatre. Most schools of a certain size have teachers who are themselves directors, designers, and TDs, and perhaps freelance on the side. Like a regional theatre, schools are in it for the long haul, so they tend to keep stock units like those suggested above. They have a season of plays each year, and shops to turn out the required production elements. Instead of a company of actors and technicians, a college or university has students who do most of the work of creating costumes, scenery, and props. That is the best way for students to learn those crafts.

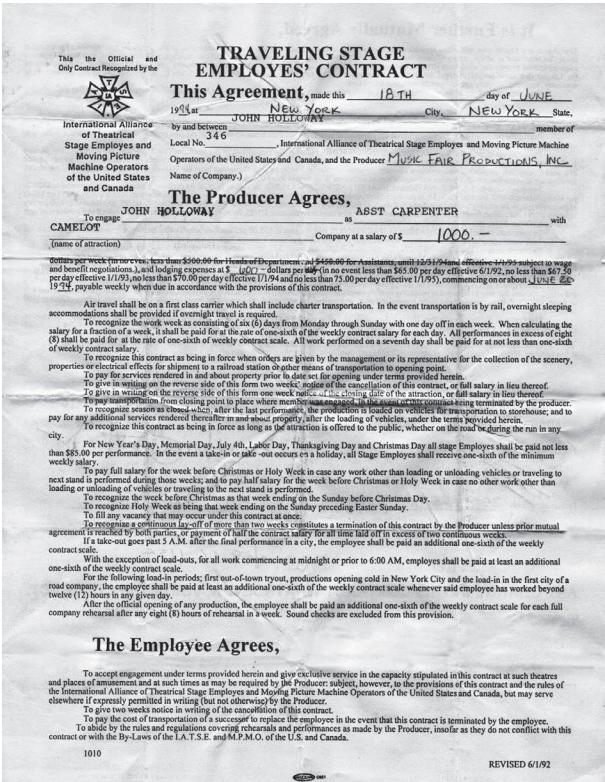
In a commercial theatre model the organization is very different. In a union environment, stagehands are divided into different departments and they tend to specialize. They are *electricians*, *carpenters*, *properties*, *wardrobe*, and *hair*. Audio and projections are often considered to be a part of the electrics department. Each theatre building is owned by a group that rents it to the company producing a show. By contract with IATSE Local One, the owner of each theatre employs a house carpenter, electrician and prop technician. These are largely managerial positions, and the *house heads*, as they are called, are responsible for hiring Local One stagehands on a *white contract* to actually run the shows. The show itself can hire an equal number of *pink contract* stagehands from other locals who owe their allegiance to the show producer rather than the theatre owner. It's a complex environment. The terms pink and white literally come from the color of paper the contracts are printed on.

In a touring show environment, the *head carpenter* is charged with the day to day business of dealing with the stagehands. The author, director, and designers do not travel with the show, so the *stage manager* is the overall head of everything, with a *company manager* who takes care of the money aspects of the show, as well as getting folks from place to place. The head carpenter is a liaison with the *business agents* of local unions along the way. Each local union has a separate number; New York was the first so they are Local One. Chicago is Local Two. A *yellow card* (they have been printed on yellow cardboard



IT'S COMPLICATED! NOT ALL THEATRES HAVE ALL OF THESE POSITIONS, BUT SOME HAVE MANY MORE.

MOST SCHOOLS HAVE SHOPS THAT THE TD AND/OR COSTUME SHOP SUPERVISOR OVERSEE, WHICH INCLUDES MAKING SCHEDULES, ORDERING SUPPLIES AND MANAGING THE WORKFORCE.



AUTHOR'S PINK CONTRACT FROM A TOUR OF CAMELOT

since time began) is sent out telling how many hands will be required in each department for the *load-in*, *load-out*, and for the run of the show. The local business agent calls local stagehands to be at a venue for the show.

IATSE stands for International Alliance of Theatrical Stage Employees. Most IATSE locals have some sort of apprenticeship program for new workers. If you are interested in that type of work, go to the IATSE website and find out the name and contact information of the local that covers your area. After contacting their *business agent* you will probably be put on a list of those who are called when work is available. The list tends to be somewhat hierarchical, so don't expect to be given the sweet jobs right away. There are more concerts and sporting events than theatrical jobs, so that is where you will likely begin, where rolling boxes to and from the trucks is the logical place to start. Eventually you will have enough experience to ask to join the union as an apprentice.

In general, you should come prepared to work in a busy environment with sturdy clothes and shoes, gloves, hair tied back and generally ready to go. If you work a performance or *show call*, be sure to bring a small flashlight for the darkness of backstage. Wardrobe folks tend to prefer a *bite-light*, which they can put in their mouth leaving both hands free. Someone will probably tell you what else to have. Early on in your career you might be told that "You can't be a real stagehand without a knife," which is true and it seems like there is often something that needs to be cut.



A DRESSER WORKING BACKSTAGE

SHE IS HELPING THE ACTOR GET HIS COAT ON DURING A QUICK-CHANGE. NOTE THE BITE-LIGHT SHE USES TO SEE WITH.

Most stagehand work is built around the idea of a four- or five-hour call. The word *call* is used, indicating that you have literally been called there to work by the business agent. After that amount of time, it is generally necessary to have a dinner break, even when it is the wrong time of day. Each local has its own idiosyncratic



TYPICAL IATSE STAGEHAND AT WORK

rules. Pay is by the hour, but frequently a show call is instead a set rate for any length of the show unless it runs longer than four hours. It may seem like that could never happen, but a concert with many opening acts, or perhaps a wrestling show may well exceed that time limit. You can see how diverse commercial live entertainment can be. Different venues may have different rates, and skill level may also be a factor. Certain specialties like rigging may pay more. Each IATSE local has its own set of rules, but the ones discussed above are generally true in most jurisdictions.

It is interesting how different the two worlds of the union stagehand and the college theatre student can be, and how little they sometimes seem to know about each other. In large cities, stagehands are mostly engaged in setting up shows and running them, so those are the important skills. The apprentice exam in Local 346 is mostly about electrics, the rigging system, and followspot operation. These are things that stagehands are most frequently asked to do. Being a stagehand is often a family tradition. It is a craft learned by being an *apprentice* and then moving on to *j journeyman*. Except for very specific union shops in New York and at larger regional theatres, most union stagehand work occurs in theatres, arenas, or convention centers. Most IATSE stagehands know a great deal about load-ins, load-outs, and running shows, but probably not so much about building scenery, which is something college theatre students can spend a lot of time doing.



A GROUP OF IA STAGEHANDS
WAITING BY THE STAGE DOOR

In a college theatre environment, students are immersed in all phases of theatrical activity, from acting and directing to design and production. A student may hang lights for one show, act in another, and build costumes for a third. College theatres generally build all their own scenery and constructing scenery in the shop is an important learning activity, requiring a huge amount of effort. College is a place for young people to see what careers are available, experience them on a limited basis,

and then decide which one is most appealing to them personally. In a larger sense, college is a place to learn about the huge complexity of the world at large and to discover your place in it.



COLLEGE STUDENTS
IN A SCENE SHOP

Many different theatre jobs are open to college students, especially production work with summer theatres that produce their work in those vacation months when school is not in session. There are many different places to search for these on the internet, but one of the most useful is *Offstage Jobs*. There are listings for all sorts of jobs, but you should plan on applying earlier on in the spring rather than waiting until the last minute. There are conferences too, such as the *South Eastern Theatre Conference* or *SETC*, and the *United States Institute for Theatre Technology* or *USITT*. These conferences are an in-person clearing house for summer theatres to find technicians. They also maintain online job boards for postings from member organizations. New social media possibilities pop up all the time, so it is best to be resourceful. Summer theatre work is something you should take very seriously as it will be a great learning experience in a practical situation that is different from your school, and wonderful as it may be, your school is a somewhat isolated environment. It is also an opportunity to network, build professional relationships, and compare notes with fellow technicians and stagehands about how to find jobs in the future. There is a virtual ocean of summer theatre jobs out there that pay enough to get by on, where you can build your skills and resume for future jobs that are better paying.

WORKING AS A SHOP CARPENTER

Working as a carpenter in a scene shop can take many different forms. You might eventually wind up in a union shop that provides scenery for a Broadway show or a large LORT theatre. Or you might work very

happily at a children's theatre or a community theatre. The work you do at any of these is really very similar. A shop carpenter should be very skilled at using various woodworking and metalworking tools. Two of the five sections in this book go into great detail about that.

A shop carpenter should be able to look at plans and know how to make a cut list of parts for constructing what is there. Very frequently the drafted plans include overall sizes of the scenery, but do not show the individual lengths of the various 2x4s and other framing members. You will need to figure that out on your own. A bit of math is involved to add and subtract fractions, and you should be able to work such problems quickly and accurately.



A person who works as a shop carpenter for a living should invest in certain pieces of equipment. You should have your own pair of safety glasses and hearing protection, and should wear both whenever working in the shop. Everyone should have their own tape measure. You will use that more than any other tool. You should probably have your own cordless drill that also doubles as a screw gun too.

If you are a competent worker, you will probably be given plans for a unit of scenery and be asked to complete it on your own. That is why reading plans, making cut lists, measuring and cutting the parts, and assembling them with tools like pneumatic staplers and screw guns are very important skills to have mastered. The job of shop carpenter is a very highly skilled artisan position.

WORKING AS A STAGE CARPENTER

Stage carpenters who work a show are entirely different from those who work in a shop. Stage carpenters are involved in setting up the scenery when it arrives at the theatre, and running the show. Being a *fly operator* is a subspecialty, which is somewhat different from a *deck carpenter* who moves scenery around on stage. In the movies the term *grip* is used instead, and some theatres

use it as well, especially if you live in a state where movies are traditionally filmed. The scenery in a musical typically moves when there is a change from one scene to another, so much of your time being a deck carpenter is spent waiting for a cue light to come on. Then there is a flurry of activity when it goes off and the scenery changes. Then you wait again.



DECKHAND WATCHING A CUE LIGHT

AS SOON AS IT GOES OUT HE WILL
USE THE PUSH STICK TO MOVE THE SCENERY
OUT ON STAGE

A *wagon* is a piece of scenery on wheels, and must hit a *spike mark* when it arrives on stage. Spike marks indicate where something should go. You should learn how to move wheeled scenery with ease. There are a few tricks to it depending on how the casters are arranged on the piece. Some scenery has all swivel casters and can move in any direction, but turning and going the opposite way requires the casters to spin around their offset. As a result it is very hard to get the piece started, and then much easier after the swivel has occurred. To avoid slowing down the scene change, you should stage the piece so that the casters are turned the right way before the change starts so that the piece moves easily and quickly. Some scenery has a mix of swivel and rigid casters and drives like a car, making it easier for one deckhand to move it. More information about how casters work can be found in the hardware

chapter. There are lots of other little tricks to being a deck carpenter that you will learn over time.

WORKING AS A FLY OPERATOR

Being a *fly operator* requires some special skills that relate to the counterweight rigging system found in most modern proscenium houses. You would not usually have a fly operator in a thrust or arena theatre because they typically don't have that sort of rigging in them, and if they do it is often not used in the action of a play. Several chapters in this book explain the workings of a counterweight system in detail, and you can refer to them for more information about how to operate the equipment. Like deckhands, fly operators spend a lot of time waiting for their cue light to come on as a warning for a cue, and then waiting for them to go out for their cue to begin.

It takes a strong person to effectively pull the ropes and move the rigging despite their counterweight. Loading the weights also takes a certain amount of strength. A fly operator must be physically fit enough to climb a ladder up to the load rail and do just that. In addition, they cannot be afraid of heights.



FLY OPERATOR MEGAN JELLISON LOADS COUNTERWEIGHTS ON A SINGLE PURCHASE SYSTEM

You must be very aware of safety practices in order to be a fly operator, because the process of flying scenery in to the stage can be very dangerous if a heavy piece comes in and no one on the deck knows it is coming. Rehearsing should make everyone aware of the movement during a show, but at other times it is very important to warn them when you fly something in with loud call and response.

The weight of scenery and lights on a pipe and the amount of counterweight in an arbor must be carefully matched, and fly operators must be very knowledgeable about how to do that. In achieving that goal, there are many situations that require an imbalance in the system for a short time while scenery/lights are loaded or removed. A professional fly operator should be very experienced in those methods. Proficiency in rope handling and knot tying is a must. The ropes can be rough on your hands, so a fly operator should carry a good pair of close-fitting gloves.

WORKING AS AN ELECTRICIAN

Most work done by a stage electrician will be in the theatre itself. Even so, you might find a job working for a company that rents stage lighting equipment, in which case you could work in their shop repairing equipment and assembling rental packages.

A stage electrician should be able to look at a light plot and understand where the various hanging positions are located throughout the theatre. The plot also tells what types of lights are hung on those positions and where they go. As a result you should be able to readily identify different types of instrumentation. An electrician should be thoroughly familiar with how to securely hang the lights on pipes, and how to safely operate the rigging system to fly them out over the stage. Usually a fly operator is present to run the counterweight system, or alternately fly the truss, but electricians must know how to complement that work, which is a matter of working safely. If you are an electrician you should also know how to rig a chain motor to a tower or truss.

A competent stage electrician should know how to move and set up ladders used in focusing lights, and how to use a stage lift. Ladders are often very tall and must be *footed* and *walked up* in a safe manner. The same can be said for a lighting tower used from the wing. It is likely that lights will be installed in the tower before it is placed on the stage, and it will be very heavy as a result.

Stage electricians should be able to work with the complex computer systems that are used to control the lights. They should be very familiar with how electricity works and have an intuitive sense about how to use equations such as $P=IE$ and $I=P/E$ to determine when an overload is imminent.



WALKING DOWN A SPOT TOWER

"FOOT" THE END ON THE GROUND THAT SERVES AS A PIVOT POINT. IF IT SLIDES THE TOWER WILL FALL ON THE OTHER STAGEHANDS. DON'T GET UNDER THE MIDDLE LIKE THE GUY IN THE DARK PANTS.

One of the most challenging aspects of working as a stage electrician is dealing with all of the cables and wires used in setting up the lighting rig. Many of them are used for power distribution, meaning that they carry enough current at 120VAC to make the lights come on. In addition, there are DMX lines that carry information to dimmers and intelligent lights, and 4pin XLR cables that carry data and power to things like LED and moving lights. Most modern systems also use category five cables as data connection.

As a result of all of the above, electricians must be master cable coilers and have a very neat approach to installing the cables on various battens and trusses. Coiling involves many different types of cables from the tiny cat five to monstrously heavy feeder and multicable. Different coiling techniques are used for different types and you should know what they are.

When working as an electrician it is absolutely essential to bring a six-inch *Crescent wrench*. Most bolts on lighting equipment can be manipulated with that



COIL HEAVY MULTICABLE ON THE FLOOR IT'S REALLY TOO HEAVY TO HOLD IN YOUR HANDS

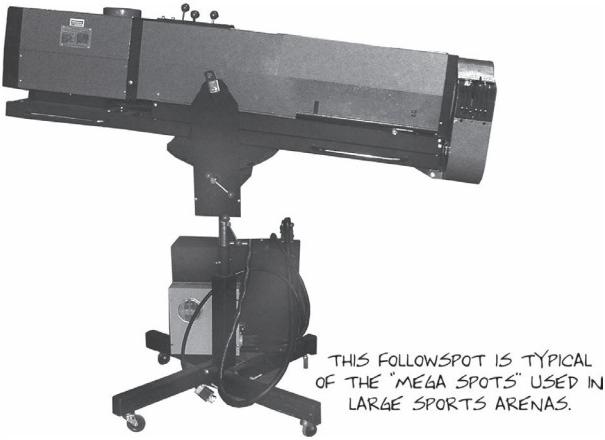
THE TECHNIQUE SHOWN HERE IS CALLED "OVER AND UNDER" AND IS A GOOD WAY TO AVOID NEEDING TO TWIST ONCE FOR EACH LOOP

size. An eight-inch might also be used as a matter of preference, but anything bigger is too clumsy.

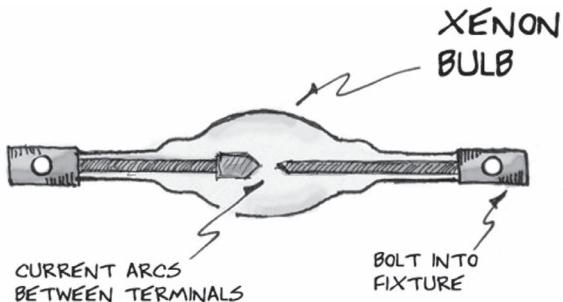
Electricians employed to work a show might include a board operator who runs the cues when instructed to by the stage manager, a followspot operator, or a deck electrician who pages cable when the scenery moves. Electricians may also include stagehands involved with operating sound or video equipment.

Being a spot operator is a very specialized category of stage electrician. *Followspots* are used in many productions. In some areas of the country they are known as a *front light*, or perhaps simply as a spotlight, or spot. As the name implies, a followspot is a lighting instrument used to follow the action of a play. The basic idea is to open up on an actor and then stay with them until the scene is over, no matter where they may move on the stage.

Followspots can range in size from tiny club instruments of 1000 watts to the behemoths used in sports arenas. IATSE stagehands are often called upon to run a spot for concerts, ice shows, wrestling bouts, and other entertainments, as well as for theatre shows.



Modern spots use a sealed-beam arc lamp like the Xenon or HMI. Xenon lamps contain a pair of electrodes sealed in a glass enclosure. The electrodes are made from a special alloy that, in conjunction with the xenon gas inside the tube, helps to re-plate burnt parts of the electrode so that they last longer. The lamps get very hot, the gas inside is under pressure, and thus there is a tendency for the lamp to explode if it is removed from the fixture without cooling down, so extreme caution must be used when changing one.

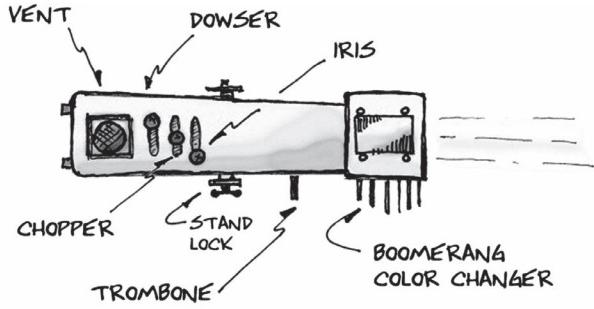


XENON IS A RARE GAS THAT CAN CONDUCT ELECTRICITY, AND EMITS LIGHT WHEN EXCITED BY ELECTRONS.

THE GAS IS UNDER PRESSURE, AND THE LAMPS REQUIRE SPECIAL HANDLING.

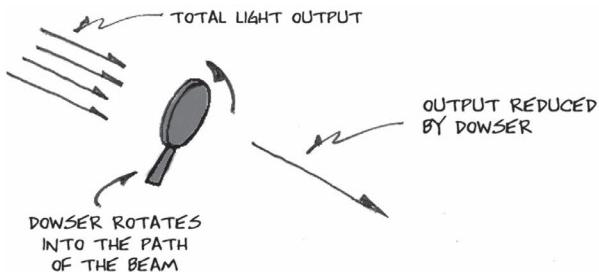
Followspots are typically used from a position in the rear of the theatre and require a lamp much brighter than that used in a standard fixture, which is one reason arc lamps are preferred. But arc-type lamps are not dimmable. If the voltage pressure supplied to them decreases below a certain point, the arc won't be able to jump across the gap and will simply sputter out. Instead of dimming, most followspots use a mechanical device to vary the light intensity. Other mechanical devices can change the size/shape of the beam, and the color of the light.

Different followspot models have different mechanical parts, but almost all have a dowser and iris.



TYPICAL CONTROL PLACEMENT
PLAN VIEW

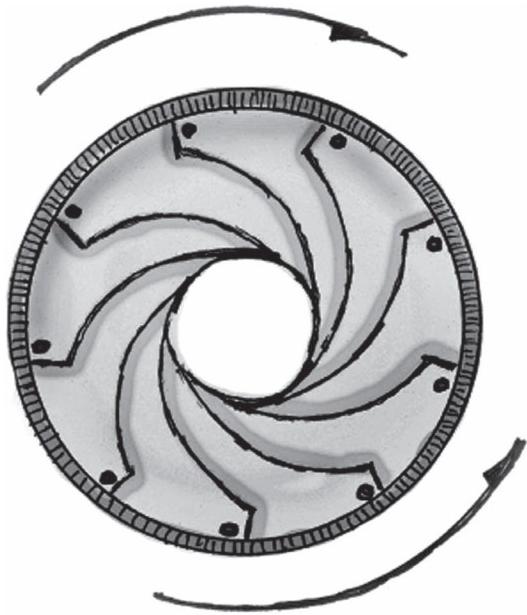
A *dowser* is used both to vary the intensity of the light output, and to black out the spot so that no light gets to the stage. The dowser is a metal disc, or perhaps metal doors, that can be moved into the path of the light beam and is used because these are arc lights, which cannot be dimmed and switched like a conventional fixture.



THE SOLID METAL DOWSER BLOCKS PART OF THE LIGHT OUTPUT. SOME DOWSERS ARE CONSTRUCTED DIFFERENTLY, IN THE MANNER OF BARN DOORS, OR VENETIAN BLINDS.

The *iris* is another control found on virtually all followspots. An iris is a system of thin, curved metal plates in a movable housing. The plates overlap one another, and when an outer retaining ring is rotated, the thin plates form a larger or smaller circle, and hence a larger/smaller pool of light on the stage. A fixture designed specifically as a followspot has a built-in iris, but a drop-in iris unit can be used in a conventional fixture to do the same thing.

You can use the iris to create a variety of spot sizes. The largest is generally the *full-body* size, which is large enough to include the entire body of the actor. You may need to go larger than that to include two characters standing right next to one another. *Three-quarter* means from the knees up and including the head. It is very rare for a designer to ask for a shot that does NOT include the actor's head and face. You should always strive to keep the head in the light no matter what. The next smaller shot is the *waist*, and then finally the *head-shot*.



TURNING THE OUTER RING
WILL MAKE THE CENTER
OPENING LARGER OR SMALLER

IRIS



FULL BODY

THREE-QUARTER



WAIST

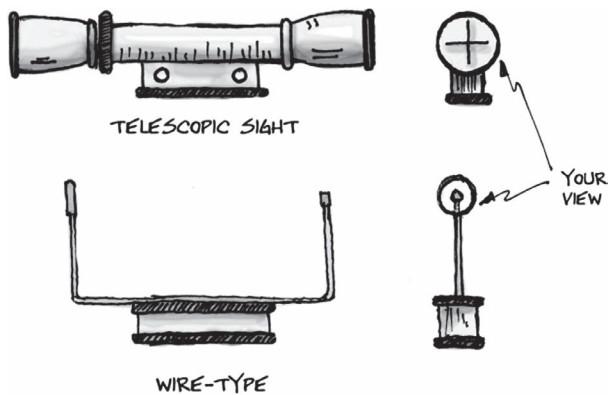


HEAD

COMMON SPOT SIZES

Running a followspot requires a lot of concentration. Professional stagehands are expected to come in and run a show cold, without ever having seen any the action of the piece. Generally, there is a *lighting director* to call the cues for a musical act, ice show, or circus, while in a theatre show, the cues are called by a stage manager, or possibly by a spot operator who travels with the show and is familiar with it. There are standard methods of setting up a show and of calling cues, which make it possible for an experienced operator to understand the cues with a minimum of explanation.

It is often difficult to have your spot lined up on the actor when the light comes up. Solutions can be as expensive as a high-powered *telescopic rifle sight*, or as low tech as a bent piece of coat hanger. A number of proprietary devices are sold specifically for this purpose and new ones are developed from time to time. You should try different things and find one that works well for you personally. Using a sight of some sort is a really important step that can enhance the artistic qualities of your spotting work.



USE A SIGHT TO IMPROVE YOUR AIM

WORKING ON THE PROPS

You may ask the question "What is the difference between props and scenery?" The line is often blurred. Very small things that you can hold in your hand such as a book or binoculars, or a pistol, are obviously props and are sometimes called a *hand prop*. Other things can be less well defined. A piece of furniture is almost always considered a prop, as would window curtains – but not the window itself. A table lamp would be a prop, but most likely not a wall sconce. These types of details have been hashed out over many decades, and are still a rather constant source of disagreement.

There are specialized props shops associated with most theatres, separate from the scene shop. These shops are typically run by the *props manager*. The props

manager is responsible for the creation or sourcing of all of the production's properties and maintenance of the company's props stock, much in the same way the technical director is responsible for the scenery. A properties manager must be highly organized, often maintaining the process for hundreds of individual props. They have to make the decision to build, shop, pull, or borrow every single prop for a show in collaboration with the scenic designer. The importance of good communication skills is paramount, as they must stay in constant contact with the director, stage manager, scenic designer, and costume shop to keep track of the shifting landscape that are the props for a show. A large venue might have a myriad of artisans with highly specialized skills working to craft props. Upholstery, furniture carpentry and restoration, sculpting, electronics, casting and mold making, soft goods, and detail painting are just a sampling of the many talents a successful properties artisan might have under their belt.

If you run props backstage, your major responsibility will be arranging them so that actors can find them easily. Quite often props are arranged on a table marked out with tape and labeled as to what goes where so that the prop crew can tell at a glance

if anything is missing. Very often a *prop cabinet* is used instead so that the props can be secured at night, especially if some of them are expensive and worth stealing. If the prop cabinet has shelves you can mark them in the same way you would a table, and if it has wheels you can roll it around backstage or into a truck. Prop guns should definitely be locked up, even if they are rubber and non-functioning. Never use a real gun on stage, one that fires actual bullets. If your show visits the Kennedy Center in DC, secret service agents will make sure that you don't!

Generally speaking, actors can go to the table or cabinet and get their own props. If they have been well trained they can sometimes take them back to the same place, and most actors will do that instinctively. Sometimes though you will need to pick things up and replace them yourself because the action of the play requires it when the actor doesn't have time to get to the prop table before re-entering. Receiving a prop from an actor as they leave the stage is called a *hand-off* and the same term is used to describe the process of handing a prop to an actor as they are headed on stage. So, if the stage manager tells you to "hand off" a prop book to an actor, figure out where they will enter and stand there, waiting for them to take the prop.

It is hard to describe what tools prop crew might need because the work entails so many different possibilities. For sure have a hot-glue gun and other types of glue as well because props very often break in the process of their use. Recommendations include having a screw gun, as well as pliers, a hammer and other common tools close at hand. Prop crewmembers definitely need a flashlight backstage because they often need to show actors where to go. Workers in wardrobe and props departments have a much closer relationship with actors than most other departments.

WORKING WITH A STAGE MANAGER

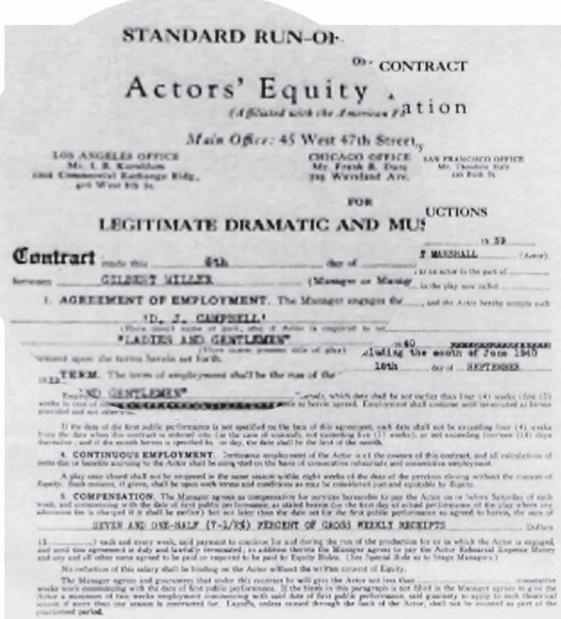
Stage managers have many responsibilities related to rehearsing and performing theatre. They are typically the first to arrive and the last to leave. It is a tough job, but also very rewarding. Professional stage managers are members of *Actors' Equity Association*, the union for actors. It has been that way since the union was formed, when virtually all stage managers were people whose acting careers had gone awry. That is no longer axiomatic, but even so stage managers are members of the actor's union rather than USA or IATSE. There is a close relationship between the crew that runs a show and the SM who calls the show. Stagehands should be very familiar with how cues are called.

In a school setting where students serve as stage manager, the role of SM is generally limited to organizing rehearsals and calling cues for a show. Each theatre organization is different and has its own rules and



BACKSTAGE PROP BOX ON WHEELS

THE SHELVES ARE MARKED AS TO WHAT GOES WHERE.
THE ADVANTAGE OVER A TABLE IS THAT THE BOX CAN BE
LOCKED UP OVER NIGHT.



AN EXAMPLE OF AN EQUITY CONTRACT FROM THE 1950S

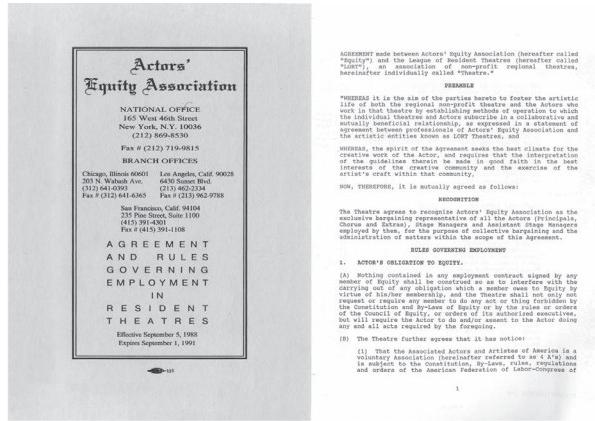
THE CONTRACT MENTIONS THAT THIS IS A "LEGITIMATE" SHOW, WHICH MEANS IT IS NOT A VAUDEVILLE TYPE PERFORMANCE, BUT RATHER A SHOW WITH A SET SCRIPT AND PLOT.

STAGE MANAGERS ARE UNION MEMBERS OF ACTORS' EQUITY ASSOCIATION RATHER THAN IATSE, THE UNION FOR STAGEHANDS. EVEN SO, STAGE MANAGERS HAVE A LOT OF INTERACTION WITH THE CREW OF A SHOW, AND OFTEN IDENTIFY MORE WITH STAGEHANDS THAN WITH ACTORS.

operating procedures. Equity stage managers must follow the rules set down in the AEA contract with their group. Equity has contracts with many different organizations, but in each case the contract is published as a booklet that contains all the *work rules* for that venue. You can find samples of that online. All unions have work rules, which are used to define responsibilities, duties, rights, and privileges.

In commercial theatre, going through *production rehearsals* means a long slog through the entire show with everyone in the theatre all the time. It can be exhausting, but all issues should be resolved by the end. Most schools and regional theatres probably use the term *technical rehearsal*, which are subdivided into different phases as detailed in the following chapter. These rehearsals are focused on integrating the changes in lighting, sound, and scenery into the action of the play.

Each change in the appearance of one of the various technical elements is distilled into a *cue*. The stage manager writes down the exact moment each cue should happen, and what number has been assigned to that particular cue so they can call them back out during a show.



THE COVER AND FIRST PAGE OF THE EQUITY CONTRACT WITH LORT THEATRES BACK IN THE 1990S.

A UNION CONTRACT SPELLS OUT THE RULES AND OBLIGATIONS OF THE PARTIES, SO IN ESSENCE IT IS THE "RULE BOOK" FOR THE RELATIONSHIP. SCHOOL THEATRES DON'T USUALLY HAVE A RULEBOOK, BUT THEY DO HAVE AGREED UPON DUTIES AND RESPONSIBILITIES.

MATTERS SUCH AS THESE ARE NOW POSTED ON THE AEA WEBSITE RATHER THAN BEING PRINTED ON PAPER. YOU CAN GO TO THEIR WEBSITE AND CHECK THE ENTIRE DOCUMENT.

Cues are most often given numbers in order to organize them, but occasionally some folks will use letters. You may work on just light cues, and then sound, and later set cues; or they may be all done at once. Lighting cues are generally marked and announced as electrics, sound as sound, and scenery as either fly or deck.

Stage managers call cues in a predictable way:

Electrics 2, House to half GO

This cue asks for the house lights to dim 10–20 seconds before the play begins. The audience knows the show is about to start, and they turn their attention to the stage.

Electrics 3, House out GO

This sequence asks for the house lights and preset lights to go out for the play to start. The theatre becomes dark.

Fly 1 GO

The curtain begins flying out in the dark.

Electrics 4 and Sound out GO

The pre-show music fades down as the lights fade up on the first moment of the play.

You should wait until the cue caller says the word "GO" before you perform whatever your cue entails, like pushing the go button on the lighting console, the space bar for digital sound cues, or rolling your piece of scenery out on the stage.

Electrics 1 is generally the *pre-show preset* that the audience sees as they enter the theatre. That could be lights on the curtain if one is used, or it could be an interesting look for the stage if it is not. At any rate, the first cue is called just before the *house opens*.

The pre-show lighting effect should be brought up before the audience comes into the theatre so that it sets the mood for what is about to happen. Before that, the work lights will have been on. Generally speaking, work lights use less electricity than the stage lights, especially if the theatre has energy-saving LED fixtures. Don't bring up the pre-show preset until just as the house opens, and you will save on both electricity and expensive stage lamps.

Quite often it is necessary to mark where something should go when it is brought on stage. Perhaps you might mark the upstage two legs of a chair or two corners of a box so that they are placed properly. *Spike tape* is a specific type of narrow tape that comes in many colors so that you can tell the difference between different marks. *Glow tape* is sometimes used if the stage will be very dark when the prop is brought out. Sometimes actors set props on the spikes, or sometimes a deckhand will do it, depending on the action of the play.

Cue calling is typically done via *intercom headset*. Electricians are often tasked with setting up the intercom system, which is used to communicate backstage when words are important. Generally speaking, stagehands who must move around a lot, like deckhands and fly operators, don't wear headsets, but those whose jobs are more stationary do. That would include spot and board operators as well as assistant stage managers. Most folks tend to use wired intercoms which are less expensive and more dependable, but the wireless type have become much more dependable and affordable over the years.



SINGLE MUFF HEADSET
WITH ATTACHED MICROPHONE

The standard intercom headset has an earpiece and a microphone. The earpiece is called a muff (as in earmuff) and the headset can be either the single or double muff type. *Double muff* headsets are frequently used when the show is very loud like a concert, but in a much quieter stage show a *single muff* headset allows the user to hear the show that is going on around them as well as the stage manager or cue caller. The headset mic on most models will turn itself off when rotated to the up position, which places it on top of the head.

Intercom headsets are meant to be used in combination with a *belt pack*. The headset plugs into the belt pack, which has a couple of adjustment features. A switch turns the microphone on and off. A knob or thumbwheel adjusts the volume of the earpiece. Most types have an LED indicator *call light* that alerts the user someone is asking them to pick up the headset.



BELT PACK FUNCTIONS

PUSH THE SIGNAL BUTTON TO LIGHT THE LED, WHICH LETS OTHERS KNOW TO PUT ON THEIR HEADSET.

THE THUMBWHEEL ADJUSTS THE VOLUME OF YOUR EARPIECE (NOT YOUR MICROPHONE).

PUSH THE MIC BUTTON TO TURN YOUR MICROPHONE ON AND OFF. DON'T LEAVE YOURS ON UNATTENDED!

Belt packs are powered by a main station, which generally lives at the stage manager's desk because it has switches the SM can manipulate to control the system. Three pin XLR cable runs to each of the belt packs, which have in and out parallel connections, so that the cable can run from one belt pack to another, rather than each one needing a direct line to the main station. Wireless is similar, excepting of course there's no mic cable coming out of the belt pack.

Backstage protocol dictates that users be careful to turn the mic off when it is not in use, to keep down unwanted noise. This is especially true when laying your

headset down and walking away. Make sure you switch the mic off so that a) it doesn't make a loud bang when you lay it down, and b) so that extraneous noise doesn't run through the system while you are away. Avoid standing too close to a stage light, because induction from the filament will create a 60-cycle hum in the entire system. Some intercom systems have more than one channel, so that the stage manager can select who can hear what they are saying. Switches turn various channels on and off.



THIS PARTICULAR INTERCOM HAS TWO CHANNELS, A & B. YOU CAN ROUTE INFORMATION TO SPECIFIC PERSONNEL BY SELECTING WHICH CHANNEL THEY CAN RECEIVE. "LINK" CONNECTS THE TWO CHANNELS TOGETHER. VARIOUS KNOBS ARE USED TO ADJUST VOLUME LEVELS.

Another means of communication for cueing is with *cue lights*, which are controlled by switches on the stage manager's desk. When the switch is turned on, a cue light is lit. This is a warning for an action to take place, so the switch should be turned on a reasonable amount of time before the cue is to occur. If the time span is too short there won't be enough time to get ready. Cue lights are a good way to communicate with the fly rail, or with deckhands, because many of them can see the light all at once, and because it doesn't unnecessarily burden them with equipment. When the cue light is switched off, it is the same as if the stage manager has said "GO." If the stage manager flashes a cue light on/off it means something has gone horribly wrong, perhaps that you missed your cue.

In commercial theatre, IATSE show calls are measured from the *half-hour* call, and it is very important to the stage hands. Most stage managers also make 15-minute and five-minute calls. *Places* means that the show is about to start, and that cast and crew alike should make their way to their opening positions without delay. At the end of every rehearsal, the stage manager can tell you when your next call will be. It is common for call times to change during the period of tech rehearsals, because so many things are still being worked out. The final few rehearsals before opening night are known as *dress rehearsals*, which originally meant that actors wouldn't wear their costumes until then. Sometimes, there are *preview performances* that are sort of like a "soft opening" for a restaurant or clothing store.

TERMS USED IN THIS CHAPTER

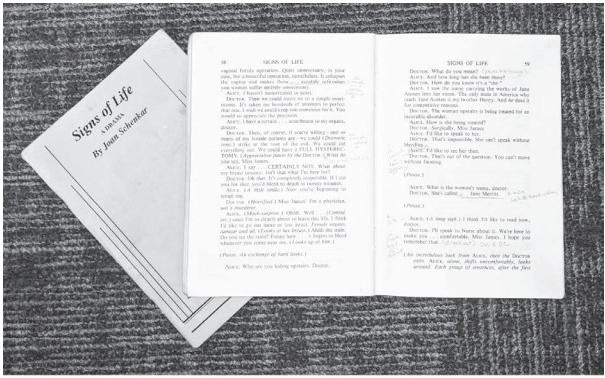
<i>Actors' Equity Association</i>	<i>ghost light</i>	<i>regional theatre</i>
<i>apprentice stagehand</i>	<i>grip</i>	<i>SETC: Southeastern Theatre Conference</i>
<i>artisan</i>	<i>half-hour</i>	<i>show call</i>
<i>Artistic Director</i>	<i>headset: belt pack, double or single</i>	<i>spike mark</i>
<i>OffStage Jobs website</i>	<i>muff, channel, call light</i>	<i>spike tape</i>
<i>bite-light</i>	<i>house heads; carpentry, electrics, fly, sound</i>	<i>spot op</i>
<i>Business Agent (IATSE)</i>	<i>IATSE: International Alliance of Theatrical Stage Employees</i>	<i>stage directions</i>
<i>call board</i>	<i>journeyman stagehand</i>	<i>stage door</i>
<i>call light</i>	<i>lighting director LD</i>	<i>Stage Manager or SM</i>
<i>carpenter, head</i>	<i>load-in</i>	<i>stagehand</i>
<i>commercial theatre</i>	<i>load-out</i>	<i>stock scenery</i>
<i>community theatre</i>	<i>LORT: League of Regional Theatres</i>	<i>storefront theatre</i>
<i>Company Manager</i>	<i>Managing Director</i>	<i>tape: electrical, gaffer's tape, glow, spike</i>
<i>company of actors</i>	<i>not-for-profit theatre</i>	<i>tech or technical rehearsal</i>
<i>Crescent wrench</i>	<i>pink contract</i>	<i>Technical Director</i>
<i>cue light</i>	<i>places call</i>	<i>USA: United Scenic Artists</i>
<i>cue to cue rehearsals</i>	<i>preview performance</i>	<i>walk up (a ladder)</i>
<i>deckhand</i>	<i>pre-show preset</i>	<i>wet tech</i>
<i>dress rehearsals</i>	<i>production</i>	<i>white contract</i>
<i>dry tech</i>	<i>Production Stage Manager</i>	<i>work lights</i>
<i>electrician</i>	<i>prop: cabinet, hand prop, handoff</i>	<i>yellow card</i>
<i>final dress</i>	<i>prop guy</i>	
<i>followspot: boomerang, color frame, dowser, iris, sight</i>	<i>property department</i>	
<i>foot (a ladder)</i>		

THE PRODUCTION PROCESS

THE WORD *SCRIPT* is used to describe the written body of a play. Almost every production starts with one. The timeline of turning that script into an opening night is called the *production process*. Every theatre organization does that differently, and every individual production follows a slightly different path. However, some basic guidelines are true just about everywhere. This chapter lays out a process of how to get from A to Z, but it isn't meant to be the absolute way of doing things, because there are so many different ways of working. Even so one must begin the discussion somewhere, and this chapter is an illustrative example of some very commonly used steps along the way. Much of it is constructed from broad generalizations, and certainly you will be able to find exceptions to it from your own experience. A lot of what you read here is organized around an idealized view of a process built on collaboration and inclusivity. Things don't always work out that way, but optimists hope for the best. Theatre is a group project requiring many different skills from lots of different people and it works best when collaboration takes those differences and melds them into a strong and inclusive whole. And while making great plans never goes unpunished, you should strive to plan your path carefully in a way that encourages creativity, collaborative input, and a space for everyone to do their job successfully.

Actually, some shows don't have a script when you begin working on them. The modern term for that is "*Devised Theatre*" which means that someone (usually the director) has a topic they want to explore with a creative group. Sometimes the actors are asked to improvise parts of it and a script is invented as the production moves along. Exciting, but also nerve-wracking for designers and technicians who need more time to work things out. It is best to allow several months for something like this, and to "workshop" it along the way. Calling something a *workshop* performance or *work in progress* is a disclaimer to the audience that what they are seeing isn't a finished product yet. Early adopters really like that sort of thing. But starting with a written script, tried and true or brand new, is a much more common path.

Words – the language, story, and descriptions – found in the text are a jumping-off point for the creative process. No matter what your role is on the production team, or your past experiences, you must begin your journey of creation by reading the script. Most people would agree that one reading is not enough. It takes several, with each successive reading having a different goal in your digestion of the text. Perhaps in the first reading you should try to lose yourself in the action and language of the play. Read the script not as a scene designer or as a props master, but as an audience member seeing it in a theatre. Try to forget who you are or why you are reading the play and just enjoy the trip the playwright takes you on.



IT ALL STARTS WITH THE SCRIPT

DESIGNING THE SHOW

The highlight of a first design meeting is hearing the director present a *concept* for the production. The concept for a show is like a mission statement that outlines the basic premise governing everyone's work. This vision can be expressed in a wide variety of ways. Sometimes a director has a concrete idea of exactly what they want to see on stage. Or it could be more nebulous. A director might come into that first design meeting wanting a conversation and could ask each person at the table what they think of the play, or to describe the world of the play their own words. Sometimes you might hear something as unimaginative as "I want this to be as close to the Broadway production as possible." More creative productions come from a place of inspiration, an idea that sparks an interest in the world of the play. Directors might present a folio of visual imagery or a single work of art that they believe speaks to the story and the world they want to create onstage. A piece of music, sculpture, fabric, or video are things that could define the world in the director's mind and give designers a place from which to begin their research.

The point is that every director approaches a play and its design in a uniquely personal way, and the design team must be ready and receptive to this vision in whatever form it comes in. The purpose of a first meeting is open communication. The goal is for designers to walk away with a direction for their research and a beginning of their individual contribution to the scope of the play. It is good to re-read the play after a discussion like this, now with an understanding of the concept or vision that will be used to interpret it. Search out the special moments that define what you as an artist can bring to the production.

Before a second meeting designers spend their time developing a body of research that they believe relates to the production and the director's vision for the show. At the next meeting they share what they have found. Often it is aimed at defining the sensory world of the play by referencing art, imagery, music, and other media

individual designers feel speaks to the script, characters, action, time period, and setting. All this must be referenced through the lens of the director's production concept. The meeting should be a conversation, with each person sharing what they have found and why they are bringing it to the group, with time for other members of the design team to respond to that research. Designers might choose to upload their media to a cloud drive so that everyone in the group can preview it in advance, or so that it may be referenced afterwards by their collaborators. This type of information sharing can be highly conducive to successful collaboration and communication.



RESEARCH IMAGES FOR CABARET COURTESY OF TONY HARDIN

Eventually the creative group will cull through this body of research and arrive at a consensual and pared down collection of ideas that define their world of the play. Much of this selection is driven by the director and their reaction to the pieces of research. Does the research presented fit into the vision the director has in their mind? Sometimes design research can show a director parts of this world they did not originally envision and help them to develop their ideas beyond where they began. In the end designers should be able to walk away from this kind of interaction ready to create their own art, drawing inspiration from the body of research agreed upon by the design team.

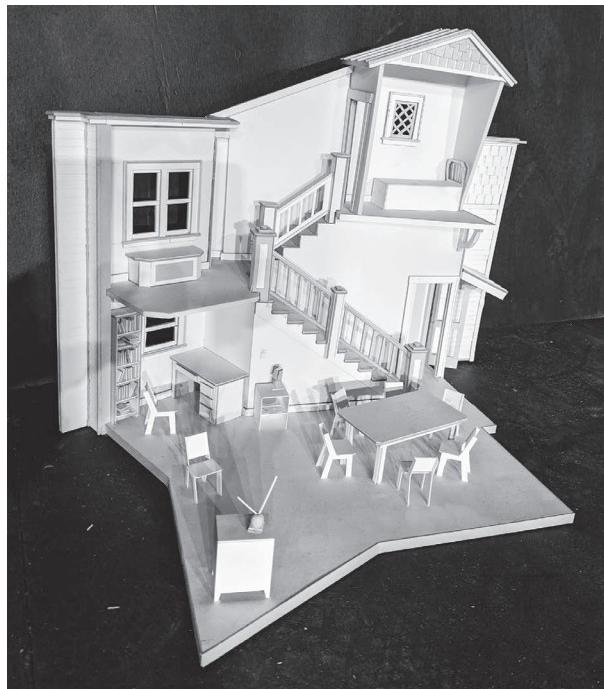
An important tenant of collaborative work is to avoid becoming unduly wedded to a particular idea that may or may not gain traction with the group. In brainstorming, *idea loyalty* can prove fatal to the creative process by preventing flexibility. Designers must find a way to emotionally separate themselves from a closely held idea, and instead adopt whatever vision best serves the production. It can be frustrating to invest time and energy into creating something, just to have the group decide to go in a different direction, but that is often

exactly how it goes. A designer must be able to invest enough time into defining their vision such that it is communicated well, but not so much that it feels like time wasted if the idea is rejected. It is often best to present multiple ideas for a design. The group can work to identify which ones are best at serving the production. Eventually everyone should be able to develop a definitive direction for their design, and the confidence to begin to flesh out those ideas into a full design. This often is not the product of just one meeting, but multiple conversations before a definitive jumping-off point is found.

Play analysis is a large area of study and could form a series of books and courses, much more than can be explored here. But even so it is important to realize that each designer begins a process of analyzing the play script for clues to designing a show. They look through the language of the play for inspiration and specifics, pulling out the requirements of the play's setting, costumes, lighting, sound, etc., indicated by the dialogue and stage directions. A set designer might begin a list of locales, descriptive dialogue-based notes, and a props list of items directly referenced in the text. A costume designer might begin the layout of a costume plot, detailing which character is in each scene, their socio-economic status, and details of their appearance, again as referenced by the dialogue. A lighting designer might search for moments in the play where the lighting can make an important statement about time or place, or how to use texture in lighting to heighten the mood of the play.

Eventually everyone has a good grasp of the concept of the play and the realities of what the script demands. Then it is time to look at specifics and to discuss them with the rest of the group. Each designer chooses a medium that works best for them as an artist. Some set designers like to present their first ideas in sketch form, while others choose quick color renderings or simple white models. Costume designers might explore their ideas by showcasing them as sketches or photo collages. Lighting designers have an extra challenge in expressing their design at this phase of the process because so much of what they do is contingent on the designs of the others on the team. They can present specific visual imagery, and perhaps a list of moments in the play where lighting can add something extra to "telling the story." This is a dangerous phase where idea loyalty can become a problem. Designers should attempt to show their ideas in a way that describes them well, but doesn't require so much time and effort that it will be difficult to abandon or alter them significantly.

After all that collaborative work, there comes a time when everyone must develop more concrete documents to describe exactly how things are meant to go, and then share them in the form of sketches, renderings, models and so forth. The director must be able to effectively



WHITE MODELS ARE A QUICK WAY FOR SCENIC DESIGNERS TO COMMUNICATE THEIR DESIGNS IN 3 DIMENSIONS

visualize various design elements in order to sign-off on them, whether that is by seeing a scale model of the set or costume sketches with swatches of fabric. The buy-in and approval of a director is a means of accepting a finalized design. At this point it is important to define the scope and vision of the design to *facilitators* who will be charged with realizing it for the stage. Facilitators are workers who must take a show's designs and turn them into reality, and include technical directors, costume directors, props directors, and head electricians. Design materials communicate rough details to these workers so they can perform *feasibility studies* of their respective designs.

Feasibility studies are as important as the approval of the director because they reveal the practicality of a design. If a design fits within the resources of the producing organization then it is full steam ahead, but if it exceeds available resources then choices must be made. Theatre at every level has constraints, with funding at the top of the list. One approach to overages is to request more resources from the production manager. Often the production manager has a *contingency fund*, monies held in reserve for just such an occasion, and they might entertain the idea of using some of it to add more money or labor to support the team's vision. But then again, they may not. Another road is for facilitators and designers to work together in modifying the design to fit within the resources at hand. This can mean changes to the design, modification of construction methodologies, change of materials, use of stock scenery or costumes,

or other cost and time saving choices. It is up to the team to make sure that these choices are made responsibly, and that the integrity of the design is maintained throughout. All this interaction is meant to get designers to the next big deadline, the presentation of their final designs. A *design calendar* must provide enough time for all the necessary adjustments, and for designers to generate all documentation needed for the communication of final designs.

DESIGN SCHEDULE: BIKE AMERICA

AUGUST 21ST - CONCEPT MEETING
SEPTEMBER 13TH - DESIGN MEETING 1
OCTOBER 4TH - DESIGN MEETING 2
OCTOBER 16TH - PRELIMINARY DESIGNS DUE
OCTOBER 23RD - PRELIMINARY ESTIMATES DUE
NOVEMBER 1ST - FINAL DESIGNS DUE
NOVEMBER 18TH - BUILDS BEGIN
JANUARY 13TH - REHEARSALS BEGIN
FEBRUARY 14TH - TECHNICAL REHEARSALS BEGIN
FEBRUARY 20TH - OPENING NIGHT

WELL INTENTIONED DESIGN SCHEDULES SHOULD PROVIDE PLENTY OF TIME FOR COLLABORATION AND MATURATION OF IDEAS. PROPER CARE MUST ALSO BE PAID TO ALLOT FOR THE FACILITATORS TO RUN ESTIMATES AND PLAN THEIR BUILD. THIS MEANS WORKING WELL IN ADVANCE OF OPENING NIGHT.

Eventually, designers submit their *design packages* at a final design meeting. For the costume designer this means finished color renderings and swatches for all the costumes to be built. Scene designers should have technical drawings or *drafting* as well as color renderings or models. Drafting is a term used to indicate drawings with dimensions, usually CAD drawings. The final design meeting is an excellent chance for the lighting designer to see everything together. The task of devising a light plot usually comes later because lighting follows the action of the play more closely, and designers need to see rehearsals to do their work. Many producing organizations require the director to physically sign-off on designs as a contractual way of recording their understanding and approval. At this point there should be no surprises if adjustments and details have been properly ironed out between designers and facilitators.

PRODUCTION PHASE

It is important to build in time for planning before construction begins. Creating a detailed agenda can help facilitators visualize the process of the physical work, and then to communicate those details concisely to the artisans who will be charged with construction. It is a period where the facilitators digest the designs and plot their courses. Proper planning is an absolute necessity for the show to go up on time. A season of plays can be selected late, meetings can be missed, designs might be delayed, but opening night is a concrete and

unchangeable deadline. Proper planning is the only thing that can get the show there on time. One cannot start running a marathon before stretching and getting in the right mindset, nor can one start a build without planning.

After that comes the actual shop work. Orders have been placed, drawings made, and schedules pinned to the shop wall for all to see. Chief facilitators, like costume and technical directors, must monitor the production's progress in the shop, and then later as it moves to the stage. Even though planning was meticulous, no plan survives contact with reality. Schedules need to be adjusted and re-adjusted. Changes in scenery construction might affect when painters can work, which can change the load-in plan, which could affect the light hang, and eventually the stage management team and anyone else who must share the space and its resources as opening night draws near. Facilitators must be vigilant in constantly assessing progress and adjusting accordingly. They must also maintain communication with each other.

Production meetings prove vital in this communications cycle. During the production phase the chief facilitators, producers, stage management, director, and designers should meet on a regular basis to talk about how things are going. It is a time for the various shops to report their progress and an opportunity to discuss challenges and changes as a collaborative group. These conversations keep everyone on the same page and working towards the same goal. While texting and email provides an excellent instant platform for information sharing, in person get-togethers harness the live art and collaborative spirit that define theatre in a way that allows us to effectively communicate and solve challenges. These meetings are an integral part of the production phase and should never be skipped over for the sake of expediency or busyness. You should never be "too busy" to learn there is a new scene in Act II.

As the end of the production phase approaches, the chief facilitators' attentions should be turned toward planning the next phase in the process, an efficient and collaborative load-in. It is a very busy time in the theatre. Everyone needs time on the stage, and the amount of time available is limited. Careful planning, scheduling, and communication will help the load-in run smoothly.

THE LOAD-IN

Once construction is complete the show must move into the theatre. Academic theatre is often afforded the luxury of working in the space for extended amounts of time in between show runs. However, the reality of the professional world is that a theatre with no audience makes no money. If the theatre is *dark*, meaning that no show is running, it is important to get a show on stage as quickly as possible. The move-in period is called the *load-in*.

Everyone needs time on stage. Logistically speaking, it makes sense for the light hang to happen first, as electricians can do their work most easily when the stage is clear. Once that happens electrics can be flown up, making way for scenery to move in. If the scene shop is offsite, scenery must come into a loading dock and wait its turn to be set up on stage. After that, the stage must be yielded to painters for touch-ups. Props tend to enter the space last because set decoration can't arrive before the set does. Prop cabinets and tables are set up off stage. Costumes are generally most concerned with dressing room space, but eventually *quick change booths* must be set up. Finally, lighting needs back into the space to focus the lights, now that there is something to focus on.



THE STAGE SPACE IS VERY BUSY DURING LOAD-IN.
SCHEDULES MUST BE CAREFULLY COORDINATED TO ENSURE
DIFFERENT DEPARTMENTS' WORK COMPLEMENTS EACH OTHER.
PHOTO COURTESY OF LATIANA GOURZONG

This is a lot of activity, and often it takes place over the course a couple of days. Crews must work odd hours to meet everyone's needs in the space. Scheduling is intense, and it takes a good production management team to time it out efficiently and fairly. Everyone has needs, and all those needs must be fulfilled if technical rehearsals are going start on time with all departments prepared. Communication and realistic goals are vital to everyone working well together in the space, and all parties involved must be selfless in their respect for the work of other departments.

TECHNICAL REHEARSALS

Tech week can begin after everything is loaded into the theatre. There are many different ways of approaching *tech rehearsals*. Terms and length of activity vary from place to place, but the basic process has certain similarities in different theatres. *Actor's Equity* allows a series of *10 out of 12* rehearsals, where a 12-hour period has ten hours of rehearsal interrupted by two hours of breaks for meals. That's only allowed during tech rehearsal week. Others choose to space out their days a bit more equitably, so that

technicians can address notes during the day between rehearsals. Either way, the goal of this phase of the production process is to integrate all technical elements with the acting and directing of the show. It may be the first time that the actors have set foot on the scenery, and they must make the huge adjustment from spike tape and acting cubes to stairs, levels, and furniture. At the same time all the technical departments are trying to make their design elements gel with the work of these actors into a cohesive and successful production. Stage managers work to get cues set and their *run crews* to work together in silent support of the actor's craft.

Before rehearsals move into the space some theatres might have a *paper tech*. Here the designers, director, and stage manager discuss cues and record them in the stage manager's *prompt book*. Coming to an agreement on placement requires time, and a paper tech takes a lot of patience, but a diligent paper tech can save time and trouble during tech week.

Many theatres start with a *dry tech*, when the director gets a first real look at the lighting designer's work and gets to hear the sound designer's work in the space. It is mostly about setting levels and looks and getting the timing right on scene shifts and transitions. Typically, this is all done without actors present, using a few spare people to stand in as "light bodies". The goal is to iron out the kinks and avoid as many potential problems that might slow later rehearsals that involve more people. Giving the director time to consider levels and looks without actors present is essential, because once the talent is on stage, the director's attention is divided.

Next up in the schedule is the *wet tech*, which might take the form of a *cue to cue*, which means skipping over large chunks of dialogue and just doing the parts of the plays that have technical cues. Moving through the script that way keeps the focus of the rehearsal on the stage manager's calling of the cues and their smooth execution by the crew. Most of the time actors are present for a cue to cue, and stage managers call out "*Hold!*" quite frequently for a cue to be run again. If the show is cue heavy, as in most musicals, there may not be enough elbow room for jumping around and instead the rehearsal is a run straight through with plenty of stopping and going back to get the calls, cues, and shifts timed out and executed correctly. Often this is the rehearsal when actors transition from rehearsal props to those crafted or acquired for the production. The end goal of a wet tech rehearsal is to iron out all the kinks in the cueing of the show, to minimize stoppages during the following dress rehearsals and get the stage manager comfortable with calling the show. Indeed, the stage manager is the priority of this rehearsal, and they must be allowed the time and patience to work things until they feel that they have the show under control.

Next up are a series of *dress rehearsals*, where *running the show* (meaning not stopping) requires an effort

at going straight through, but it doesn't always work out. This may often be the first time that costumes are introduced, so quick changes might become a cause for stoppage. It is important for the technical elements of the show to run as smoothly as they can during dress rehearsals, because it is a delicate time for actors who are attempting to assimilate weeks or months of rehearsal with new elements like lighting, sound, and costumes. Actors need these runs to be as nonstop as possible, allowing them to focus on becoming the character. The general way of handling miscues during dress rehearsals is by taking specific *notes*, so that things run more smoothly next time. But if a general breakdown occurs the company might work things out in a special rehearsal for that section after the run is over. Customarily the production team meets at the end of each run to discuss their notes, and determine what needs to be addressed before the next day's rehearsal.

Throughout technical and dress rehearsals people are busy taking notes for their respective shops. There is never enough time in the day, so the facilitators must decide which notes are most important and work out the logistics of stage time. Everyone needs time in the theatre, and getting it all done often involves working at odd hours between rehearsals and sharing the space with lights, sound, and scenery all working at the same time. The lighting designer will also need time to cue the show, and no matter how much visualization is done beforehand, live time on stage is always needed to adjust and polish their looks. While it is never ideal, we must be collaborators and work while being mindful of other's needs.

It's opening night! The audience pours into the theatre and the show now belongs to the stage manager. The design and production team all move onto the next project and it is up to the stage manager to maintain the integrity of the production. Whether it is a two-week or two-year run, the stage manager must keep the show running the same way that the director and designers left it to them. After the curtain on every performance the stage manager should issue a performance report that can be monitored by the department facilitators. If there are technical issues or repairs needed, the facilitators need to get those issues addressed by their crew efficiently so that the show can go on.

Date: Friday, November 30th
Scheduled Time: 5:45pm-11pm
Location: Guignol
Agenda: 2nd Performance
Accomplished:
5:52-Lifts in Fight Call
5:58-Song Call
6:04-Fights in Fight Call
6:29-End Fight Call
7:00-House Open
7:35-Go
8:50-Intermission
9:05-Back from Intermission; Go
10:18-End
10:30-Talkback
11:08-End Talkback

Next Performance: Saturday, December 1st

General Notes	
The weather was approximately 52 degrees, cloudy, sprinkling rain around 6pm	
House Count: 250	
Crowd was very responsive with a lot of clapping, cheering, and laughing during the show. They gave a standing ovation.	
Attendance/Cast Notes	
Javonte Moorman, late (unexcused)	Direction
Morgan Courtney, late (unexcused)	Music
Micah Johnson, late (unexcused)	Choreography
Tedrin Blair Lindsay, late (unexcused)	Set
One of the lid ropes in one of the trunks had to be repaired before the show. Thank you!	
Props	
We used the new Stache sword tonight due to the old sword's handle being loose. We placed the old sword in the prop room.	
The bottom of The Wasp came off of the model ship when pulling it out of its holder in the trunk during Act 1. The Wasp has been placed in the prop room.	
Tara's small sword broke into 2 pieces during the boxing ring fight. It has been placed on top of the prop cabinet.	
The single bird dangling from the pole fell off of the string during Act 2 Scene 1. It was repaired during the show.	
The crew member who has set the hand in the trunk every night set the hand in the wrong trunk	

SAMPLE OF A PERFORMANCE REPORT.

As the production approaches the final performance the facilitators must plan the *strike* of the show. Every show eventually comes to an end, and the theatre is restored so that the next production can load-in and do it all over again. Striking the production is just as complicated as the load-in, if not more so. Everyone busily undoes all their hard work, in a quicker and more chaotic fashion. All the department facilitators must communicate and collaborate to make this happen smoothly, keeping in mind safety and the needs of others in their timing and decision making. Scenery, costumes, and props must be struck with careful choices being made as to what is kept, handed down, and scrapped. Once everything is out and before the next show loads in, it is important to take time for the equipment and facilities maintenance, to keep everything in healthy working order.

TERMS USED IN THIS CHAPTER

10 out of 12
concept
contingency fund
dark
design calendar
design package
devised theatre
drafting
dress rehearsal
dry tech

facilitator
feasibility study
Hold!
ideal loyalty
load-in
notes
paper tech
production meeting
production process
prompt book

quick change booth
running the show
run crew
script
strike
technical rehearsal
wet tech
work in progress
workshop

SECTION TWO

THE THEATRE AND ITS EQUIPMENT



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

THRUST THEATRES

THE MODERN INTEREST in thrust theatres might well trace its origins back to the 1950s when theatres like those at the *Stratford Festival* in Ontario, and the *Guthrie Theatre* in Minneapolis emerged. These theatres were two of the first, but were among many others formed by companies of actors who were interested in creating a new type of emotional realism on the stage. They became the first large *regional theatres*, ones not in New York, but rather in other regions of the country. Before that most professional theatre outside the city was in the form of touring companies, many of which had origins and/or bookings that came from New York. Most theatre venues in cities across America were owned by theatre *syndicates*, which had complete control over what shows would be staged. Actors often had little or no control over how they were treated by large monopolies.



Photo by Marty Nordstrum

THE GUTHRIE THEATER IN MINNEAPOLIS

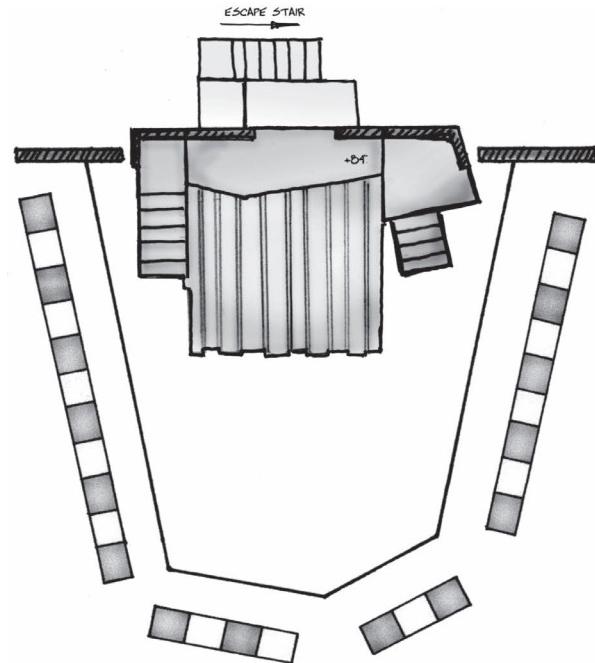
1963 PRODUCTION OF CHEKHOV'S "THE THREE SISTERS"
DIRECTED BY TYRONE GUTHRIE.

In the 1920s the *New Stagecraft* movement began when artists such as playwright *Eugene O'Neill* felt that control of theatre should shift away from theatre owners and be given to the artists themselves. These theatres would later become what we now know as not for profits, which are funded in part by donations from their patrons and not just ticket sales. Theatre intellectuals promoted the idea of the *Little Theatre*, in which small, independent theatres were formed by artists who lived and performed in that area rather than by bringing in outsiders via touring. A couple of decades later *Constantin Stanislavsky's* ideas about *method acting* were made popular in the USA by *Lee Strasberg* and *The Actors Studio*, which completed a cycle that brought out the need for a type of theatre architecture that celebrated the connection between actor and audience rather than serving as a facility for spectacle, which proscenium theatres had long provided.

The thrust theatre became very popular because it brought audience and actor together in a way that was quite astounding for the day. Modern theatergoers have become so accustomed to this form of seating arrangement that they probably don't appreciate how novel it all was in the beginning for an audience used to a proscenium picture-frame stage. With audience wrapping around three sides, the number of seats in the front row is doubled or perhaps even tripled. The number of seats in each row going back is larger than the one in front of it. Relatively few rows are needed, and even the back row is closer to the stage than the middle of a large proscenium house. With such a close association, audiences can easily hear small intonations in the actors' voices and feel much more connected to them than in a larger house. This was especially important in an era before sound reinforcement was possible.

Thrust theatres have remained popular, or perhaps even gained in popularity, possibly because the type of drama (other than musicals) that Americans prefer has shifted in the direction of what can be staged in a thrust theatre. Many modern plays are often said to be written "like a movie script" where notions of time and place are blurred, and they shift back and forth quickly from one location to another. It is generally not possible to create scenery for each new location in such a script, and instead designers often use a *unit set* that serves all locations in an abstract way. A thrust theatre is perfect for that and has been used for such purposes going back to the Elizabethan stage of Shakespeare's era, where the audience was asked to imagine vast palaces and battle scenes. Instead of literal, physical scenery the audience is asked to use their imaginations.

You might also consider that the type of play performed in a thrust theatre is a reaction against the faux realism of gritty movie scripts. It isn't possible for any type of theatre to compete with movies shot on exotic locations, no scenery will compare with that. But movies



UNIT SET ON A THRUST STAGE

ONE SET CAN BE USED FOR MANY LOCATIONS

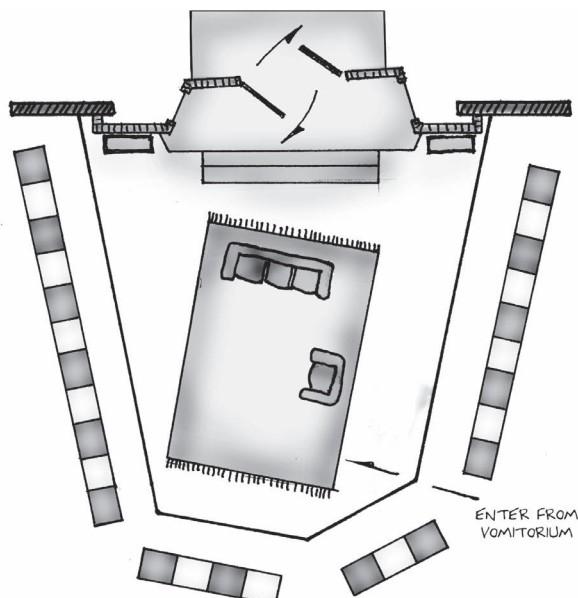
are a recorded art form, and don't have the excitement of live actors on stage. Perhaps thrust and arena theatre performances have surged in popularity because they do the best job of utilizing the live aspect of theatre rather than attempting to compete with a movie in creating spectacle. The transformation started by actors in the 1950s and 1960s, who were attracted to emotional realism and to a close connection of actor and audience, is now complete.

THE THEATRE ITSELF

In a proscenium house, the audience view of the stage is more or less consistent throughout the theatre, and although some seats on the extreme sides have a slanted view of the action, the stage retains a kind of movie-screen quality that is familiar to viewers. In a thrust theatre, the audience view from the far left is completely the opposite of that from the far right. Patrons seated at the downstage edge of the stage see the action from straight ahead, more like a proscenium. This variation in *sightlines* requires that special techniques be used by both directors and designers so that everyone in the audience enjoys the same quality of experience.

Most thrust theatres have either a modified proscenium opening, or some type of architectural staging at the upstage end of the playing area. (Architectural features are those built into the theatre by the architect and are permanent constraints for the set designer.) Some theatres have semi-permanent Shakespearean inner/

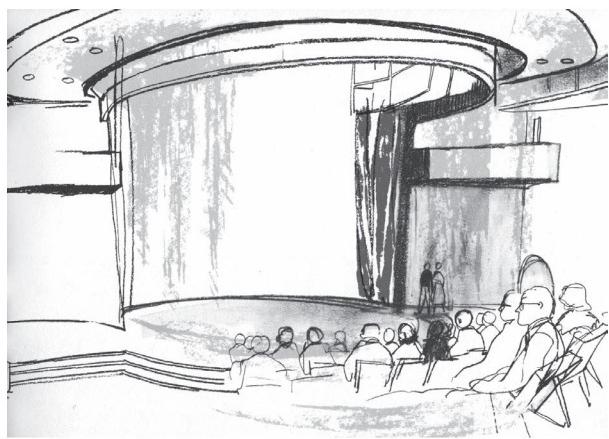
above inner below/balcony type features which are very much like Shakespeare's Globe stage. For a few, the thrust is really just an extraordinarily large proscenium apron. For most there is an open proscenium arch with a backstage area that allows the set designer to concentrate larger scenic units there. Designers must carefully plan these so that they do not stick out so far downstage that they block the audience view from the extreme sides. Likewise, care must be taken not to use visual elements in the far downstage space that might block the view of persons sitting there. A wall, refrigerator, or even a large wingback chair is certain to annoy anyone who cannot see past it to the action of the play.



REALISTIC INTERIOR IN A THRUST THEATRE FLATTENED OUT AGAINST THE BACK WALL

Seats in a thrust theatre are generally quite steeply raked to help alleviate this issue, and as a result the appearance of the stage floor assumes a much greater focus than in a proscenium theatre where the audience view of the floor is extremely oblique, other than from the balcony. Low platforms and other intricate floor treatments are popular choices in a thrust theatre. Low-mass scenic elements like lamp posts, bentwood chairs, and small props are often used in downstage areas.

Some thrust theatres have a completely unique aspect such as an elevated performance area that is not connected to the main part of the stage. Perhaps this is an homage by the architect to Shakespearean concepts of staging. Elizabethan playwrights wrote scenes expecting balconies to be available for important speeches such as Juliet's famous words to Romeo. Each theatre seems to have its own unique name for such a space, and although not found in all thrust theatres it is a frequent addition.



Drawing by Virgil Beavers

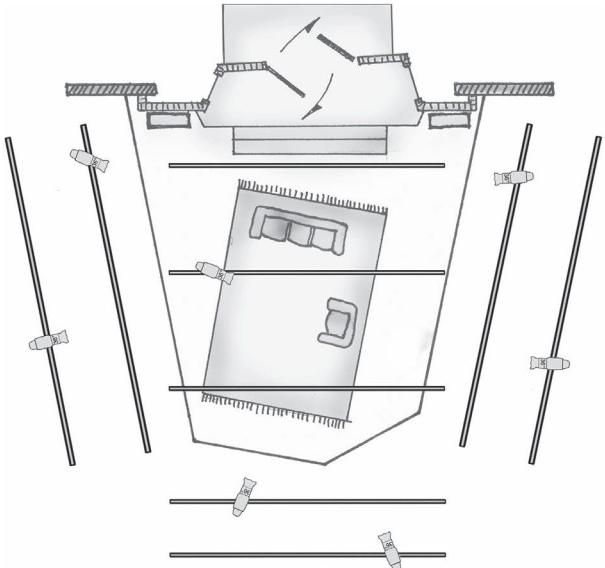
A LOVELY HAND SKETCH FROM THE DALLAS THEATER CENTER'S OPENING IN 1959

NOTE THE TWO SIDE STAGES, WITH OVERHANGING BALCONIES. ARCHITECT FRANK LLOYD WRIGHT MAY HAVE IMAGINED THEM BEING USED BY JULIET.

Many thrust theatres have one or more entrances from under the stage, or between seating areas known as a *vomitorium* or vom. The purpose to provide an alternate entrance to the stage. It can be really exciting to have an actor enter right next to you when seated near a vom. Scenery and props can move on from there as well, but this is often complicated by ramps and steps used to reach the stage floor.

Because thrust theatre scenery is often a unit set, or completely open staging, lighting takes on even greater importance here than in a proscenium space. If the setting is abstract, or perhaps merely a group of different platform levels, lighting must assume the job of establishing time and place. To add yet another level of complexity, just illuminating the faces of the actors becomes more difficult when the audience is seated on three sides of the stage and views of the performance are from three different angles. As a result, the lighting positions in a thrust theatre are often treated in a substantially different way than what you would expect in a proscenium theatre. Whereas proscenium stages have front-of-house positions and onstage electrics, thrust theatres generally have a set of *catwalks* over the stage to provide positions for lights hung over the acting area, and often more catwalks over the audience areas to provide pipes for fixtures that allow light to enter the space at an angle. Steel beams create an open appearance to the grid over the stage so that there is more opportunity to hang lights pointing different directions.

Some theatres may have an altogether different approach to creating a grid over the stage and audience, using panels of woven mat of aircraft cable called a *tension wire grid*. The individual cables are small, typically $\frac{1}{8}$ " in diameter, and are several inches apart. They cover the entire space so that catwalks are not needed. As a



LIGHTING POSITIONS IN A THRUST THEATRE

THEY MAY VARY WIDELY FROM THEATRE TO THEATRE,
BUT MOST THRUST SPACES HAVE EXCELLENT
ACCESS TO LIGHTING POSITIONS

result, the floor space is quite open and allows for much more freedom in focusing lights in multiple directions. That is not always possible when a grid made of steel beams and catwalks are used. The wire grid is weight bearing, so that electricians can walk around on it with no need for individual catwalks. The effect is somewhat like walking on a circus net and takes some getting used to, but it is actually quite fun once you get your sea legs. You might think that the steel cables would cast shadows on the stage when light passes through them, but that does not happen. The cables and lights are so close together that the shadow effect is blurred and not visible on the stage.



TENSION WIRE GRIDS ALLOW LIGHTS TO BE FOCUSED
DIRECTLY THROUGH THEIR WALKING SURFACE WITH
MINIMAL EFFECT ON THE QUALITY OF LIGHT.
PHOTO COURTESY OF THE UNIVERSITY OF MARY WASHINGTON
DEPARTMENT OF THEATRE & DANCE - GEOFF GREEN.

In general, thrust theatres tend to have a more modern look than most proscenium theatres often times having an open ceiling and often make no attempt to hide mechanical systems used for heating and cooling, a design choice that has become quite popular in public spaces everywhere. Many modern buildings take the same approach in celebrating the look of their mechanical workings rather than hiding them. In a traditional proscenium house, care is often taken to attempt to hide the mechanics of lighting, but the more modern thrust type tends to lean in the direction of the adage "form follows function" and lighting equipment is exposed to the audience in a constructivist manner. This allows for much wider latitude concerning fixture placement, and thus leads to superior lighting design possibilities.

TERMS USED IN THIS CHAPTER

The Actors Studio

catwalk

Constantin Stanislavsky

Eugene O'Neill

Guthrie Theatre

Lee Strasberg

Little Theatre

method acting

New Stagecraft

sightlines

Stratford Festival

Syndicate (theatre owners)

unit set

vomitorium

wire tension grid

BLACK BOX AND EXPERIMENTAL THEATRES

AS THE STAGING of modern theatre evolves, so do theatre spaces. A *black box theatre* provides a flexible space that theatre companies can adapt to suit the nature of a particular production and audience. Many off-off-Broadway theatres tend to be this type of venue because it is the easiest and least expensive to construct. At its heart, a black box theatre is just an empty room painted black. Gone are the vestiges of proscenium arches, fly systems, and permanent seating. A black box theatre is formed by four walls, a ceiling, and chairs for the audience to sit on. But from there any number of additions can be made.

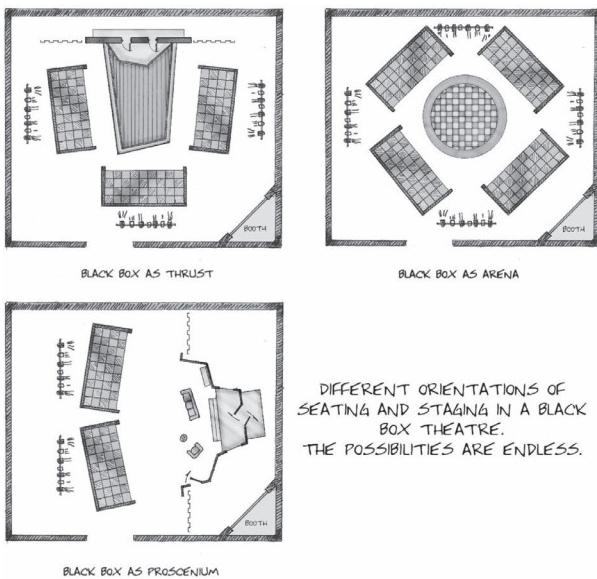


BLACK BOX THEATRE SPACE

THE LUCILLE LITTLE THEATRE AT TRANSYLVANIA UNIVERSITY IS TYPICAL OF MANY BLACK BOX THEATRES; WITH MOVEABLE SEATING RISERS AND AN OPEN WIRE LIGHTING GRID.

Black box theatres run the gambit of theatre architecture and equipment from a converted storefront in a strip mall to a purpose-built high tech theatre space, and many things in between. What they all share is that they are smallish, intimate spaces; and their form begs for experimentation.

The most important feature of any black box theatre is its flexibility. Given the right equipment and infrastructure any large, empty room can become anything the producing organization imagines. Should the group decide they want a proscenium theatre, they can accomplish it by hanging two legs and a border midway in the room. Place all the seating on one side of it and you have created a *fourth wall* with the single perspective formality which defines a proscenium space. Move that leg and border set backward to leave room in the house for three banks of seating around the stage as in a thrust theatre. Remove the soft goods all together and add a fourth bank of seating to create an arena theatre experience, enlisting the audience as a backdrop for the play's action. Think outside the box entirely and rearrange the stage and seating in to any formation imaginable, taking on an amorphous and immersive quality that suits the dreams of the director and designers. Forgo traditional seating and the space can be fitted out to resemble a bar, restaurant, or even the pitch of a soccer field. The natural seating in the environment becomes a place for the audience themselves to sit. A black box theatre is truly a place to dream without the typical constraints imposed by theatre architects.



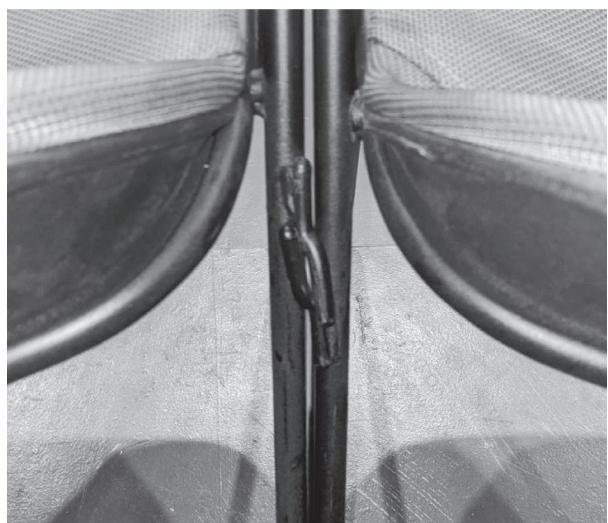
The walls of this sort of theatre are black because that color absorbs the widest spectrum of visible light and affords better stage lighting with darker blackouts. Dark walls also provide a neutral color space. Quite the antithesis of the ancient Greek and Roman theatres, the

black box theatre strives to dictate absolutely no context or setting in its architecture. The more dressed out the space is, the less successful it functions as a laboratory for pure theatrical experimentation. Sometimes the walls are lined with black drapes, black carpeting, or black soft covered paneling to help deaden the space acoustically. Generally speaking, everything in a black box theatre is black.



FLEXIBLE ACOUSTIC PANELING OR DRAPES HELP MITIGATE THE LIVE NATURE OF THE EMPTY SPACES USED AS BLACK BOX THEATRES.
PHOTO COURTESY OF EBEN ALGUIRE

Beyond the walls, a black box theatre needs chairs for the audience. Most true black box theatres are equipped with the maximum number of seats allowed in the space by the *fire marshal*. As a result, there are rules about how to arrange them. The seats should be interlocking, able to be set up however is appropriate for the



SEATING INTERLOCKS TIE THE AUDIENCE SEATS TOGETHER AND PREVENT SEATS FROM BECOMING DISPLACED HAZARDOUS AISLE OBSTRUCTIONS IN CASE OF EMERGENCY.

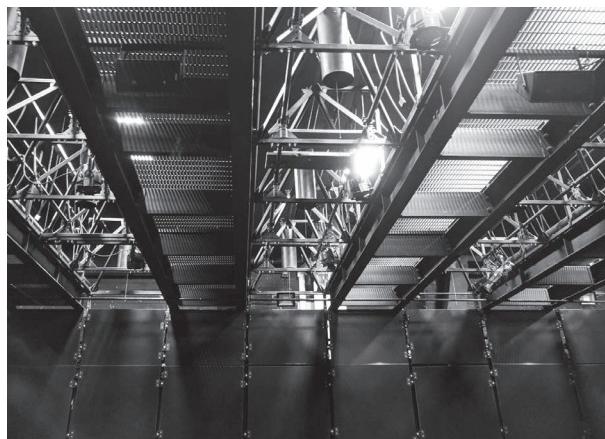
show, but joined together in a way that they function in units. *Interlocking seats* create less risk of a chair being overturned and becoming a trip hazard or obstruction in case of emergency. The seating should also be furnished with a storage system, some way of stacking or otherwise organizing and moving the seats en masse, because they need to be cleared out of the space when rearranging it for different configurations.

Risers are used to create various levels of seating. Elevated tiers of seating provide better sightlines for audience members, and many different manufacturers sell riser parts that work together as a system. They have basic building blocks you can use to assemble complicated shapes. Rectangles, custom angled and curved sections, railings, steps, facings, and toe rails are available. Be extra careful when setting up the risers and make sure the audience is safe. Broken risers and legs should be decommissioned, and railings properly installed to keep chairs and audience members from falling off the risers. Consult with the local fire marshal about egress from the seating area, as it is not always obvious where the problems are. Fire marshals appreciate this sort of attention to detail and it is better to have a good relationship now than a bad one later.



A GOOD RISER AND SEATING SYSTEM IS CRUCIAL TO FLEXIBLE AND FUNCTIONAL BLACK BOX THEATRE.

The lighting system in a black box theatre must be as flexible as its seating. In spaces with low ceilings this might be simply a grid of pipes hung just below the ceiling. A purposefully designed black box theatre often has extensive *catwalks* in place around the perimeter and crossing over the entire space to allow for lighting angles to be as diverse as possible. The catwalks have pipes and electrical raceways on either side of them to provide as many lighting positions as possible. A separate lighting system is often underhung on these catwalks, illuminating the entire space in a dimmable wash that functions as both house light and work light.



A SYSTEM OF CATWALKS OVER THE ENTIRE BLACK BOX SPACE HELP FACILITATE LIGHTING IN ANY SETTING AND STAGE CONFIGURATION.
PHOTO COURTESY OF EBEN ALGUIRE



INTERIOR VIEW OF A BLACK BOX'S CATWALKS.
PHOTO COURTESY OF EBEN ALGUIRE.

Another method of providing a flexible lighting setup for a black box theatre is by using a *wire tension* grid discussed in Chapter 3 on thrust theatres. It is the ultimate in flexible lighting arrangements as there are no angles or blind spots dictated by the layout of catwalks. A network of power and pipes are installed above the grid, designed to give the lighting designer unfettered access to illumination options. Speakers can be placed anywhere, directly sitting on the wire grid and pointing down at the audience.

An *operating booth* should be set high into one of the four walls of the black box space. There is no existing precedent about where this booth should go, and is ultimately dictated by the architecture and infrastructure of the building. In a properly designed black box theatre the booth is the only feature that should have any influence over how the stage and audience spaces are configured. The crew and stage manager in the booth should

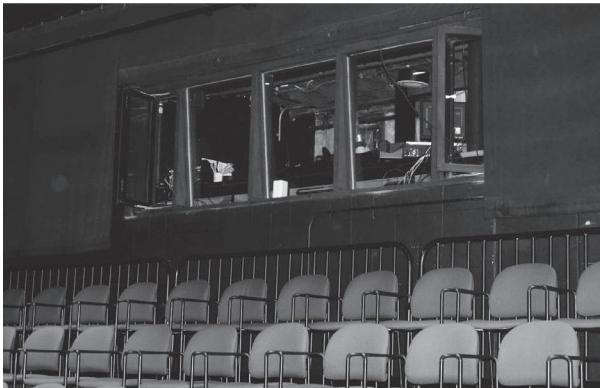


TENSION CABLE GRID

THE GRID IS MADE FROM PANELS STRUNG WITH 1/8TH INCH STEEL WIRE ROPE WOVEN TOGETHER, AND THE EFFECT IS VERY MUCH LIKE WALKING ON A CIRCUS NET.

PHOTO COURTESY OF INTERAMERICA STAGE INC.
AND TOM ARBAN

have a clear line of sight to the stage space, and the audience should, if possible, not be looking at the booth and its personnel during the action of the play. Even so, great care must be exercised by the booth's occupants to remain as unobtrusive and unlit as possible. As most black box spaces are small theatres, the stage manager must take care to quietly call the show as to not be heard by the audience.



THE BOOTH IN BLACK BOX THEATRES IS USUALLY VISIBLE AND CLOSE TO THE AUDIENCE. CARE MUST BE TAKEN BY THE CREW TO NOT BE A DISTRACTION.

Some really well-funded black box theatres push the boundaries of flexibility when it comes to the floor. With enough investment and infrastructure some organizations have built spaces where the entire floor is broken up into small traps, or even individually articulated lifts or elevator platforms. That allows the floor to rise up and become the audience's risers as well as be sculpted to suit the action and setting of the play.

SITE SPECIFIC THEATRE

Site specific theatre is an umbrella term used to encompass everything from guerilla theatre to some environmental theatre. Here we use the term to refer to theatre presented outside the confines of a traditional theatre space. In its purest form the artists strive to establish a relationship between the play's content and the place chosen to present the work. Be it a family drama presented within the walls of a real home to the striking performances of *Waiting for Godot* staged by Paul Chan and the Classical Theatre of Harlem in the hurricane Katrina-ravaged ruins of New Orleans neighborhoods, this work pushes theatre into new and immersive places. Warehouses, night clubs, basketball gyms, and the capitol steps can all become theatres where a story can be told often with more emotional impact than it could in a stodgy proscenium theatre.

Site specific theatre can be an amazing experience, completely emerging the audience into the world of the play in a way that is impossible within the confines of the theatre building. No one can argue the poignancy of that staging of *Waiting for Godot* on the ruins of the 5th Ward in New Orleans. But these productions must be very carefully studied and planned, as their logistics can prove a nightmare if not fully prepared for. As a new experience for most artists involved there can be many challenges that just are not seen coming. What initially seems straight forward in its inception can prove brutal in its realization. The technical crews must remain flexible with their resources and adapt to overcome anything that comes their way as they explore theatre in an experimental way.

TERMS USED IN THIS CHAPTER

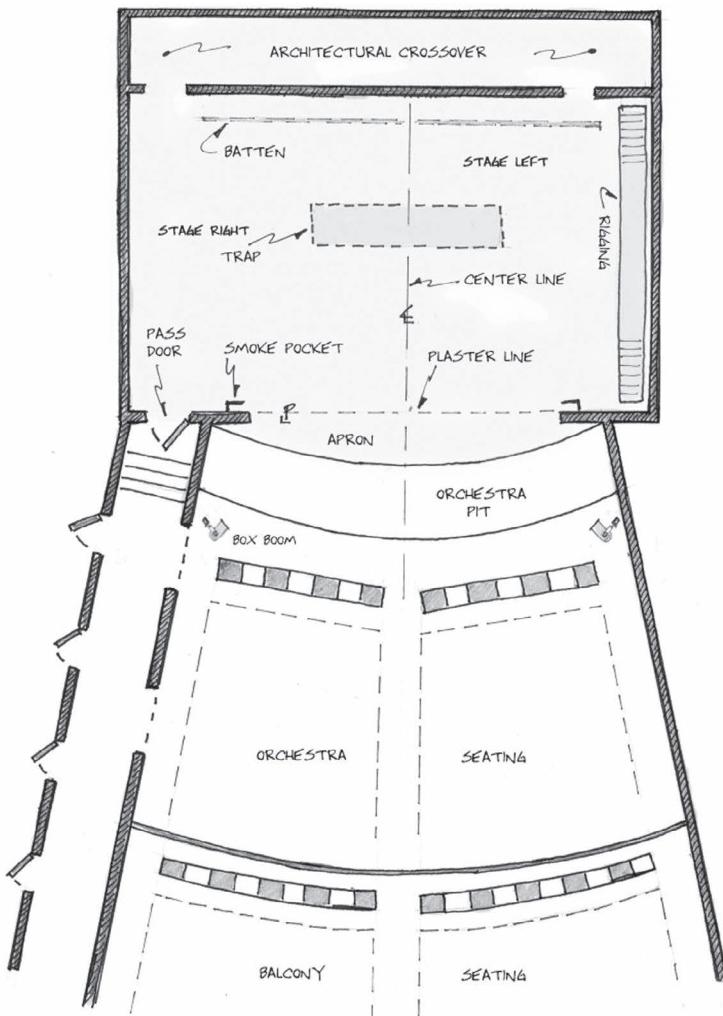
black box theatre
catwalk
fire marshal

fourth wall
interlocking seats
risers

site specific theatre

PROSCENIUM THEATRES

IF YOU ARE staging a Broadway musical, this is the theatre for you. Proscenium theatres were developed for just that sort of spectacle. Plays are written with specific ways of staging them in mind, and any show more than 40 but less than 400 years old was probably written with a proscenium theatre in mind. They have lots of equipment to “make the magic happen” and it is important for any aspiring stagehand or shop carpenter to know as much as possible about this type of theatre.



PLAN VIEW OF A PROSCENIUM THEATRE

THE AUDITORIUM

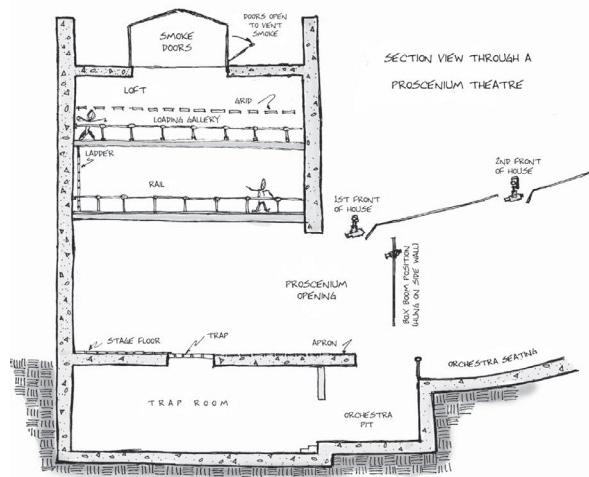
In any *plan view* drawing of a theatre, the stage is always shown at the top of the paper and the auditorium at the bottom. Downstage is down the page toward the audience, and upstage is up toward the back wall. Stage left is to your left if you are facing the audience, and stage right is to your right. On the paper left and right are reversed from these stage directions. House left and right are just the opposite, and are the way the drawing looks on the page. It can be a little confusing. The proscenium frames the stage for the audience, just like the frame on a painting. The areas to the sides of the stage (offstage) are called *wings*. Some theatres have very little wing space, and some have a great deal. The Metropolitan Opera in New York has the same amount of wing space on each side as there is on the stage itself, but that is very rare. The Met is a giant theatre.

The *fly rail*, or rigging equipment used to fly scenery over the stage, can be on one side or the other, but whichever side that is probably has less wing space than the opposite one. In an older theatre like those on Broadway, the dressing rooms are likely on the non-rail side and go up several floors.

In a newer theatre, the architects may have created a hallway directly behind the stage used to travel from one side to the other, and this passageway is known as a *crossover*. Road houses used for touring shows probably have a *loading door* on the back wall that leads to an alley or street, making that impossible. An alternate style of crossover runs under the stage and is accessed by a set of stairs on either side. You are more likely to find that in an older building, especially one in an urban setting. Quite frequently the staging of a particular show requires that actors exit from one side of the stage and immediately reappear on the other, and there may not be time for a quick run through the basement. A temporary crossover is often created by hanging drapes across the upstage part of the stage. A space is left between the drapes and the back wall, allowing actors and stagehands easy passage from one side to the other. Often an extra full stage drape is hung between the furthest upstage drop and the temporary crossover to keep the air moved by the actor's crossing from causing ripples in the backdrop.

An imaginary line that runs across the stage from one side to the other directly upstage of the proscenium opening is known as the *plaster line* and is used as a point of reference for locating scenery on the stage. It is called the plaster line because that is where the plaster of finish work in the theatre stops and the unfinished backstage area begins. The wall finish only matters when the audience can see it, and upstage of the plaster line the walls are typically unfinished concrete block and steel. The center of the stage is marked by the *center line*. Think of these two lines as the x and y axes of a graph for measuring placement of scenery on the stage. The area of the stage

downstage of the plaster line is referred to as the *apron*. The *main drape* is usually located just along the plaster line. Off the front edge of the stage, and sometimes partially underneath, is the *orchestra pit*. Most theatres have an entrance to the pit from underneath the stage, possibly from the trap or dressing rooms. In some theatres the pit can be lifted on hydraulic jacks to become part of the apron for a straight play when no orchestra is needed.



Seats on the lower level of the auditorium are known as *orchestra seats*, being near the orchestra pit and as a throwback to the orchestra of the ancient Greek theatres. In many theatres one or more *balconies* add additional seating. If there are multiple balconies, the lowest one may be called the *mezzanine*, and the very front of that the *loge* seats. Balconies are stacked up on top of a portion of the orchestra seats in order to reduce the average distance from any one seat to the front of the stage. Otherwise, the auditorium would be extremely deep and the very back seats would be an incredible distance from the stage. *Box seats* are on the side very near the stage; you might picture where Lincoln was sitting in Ford's theatre. The idea in years past was for those seats to be taken by very high-profile viewers, so that the audience could see them at the same time as the show. Paradoxically, these were generally the worst seats in the house because of their bad sightlines. Nowadays they are the cheap seats.

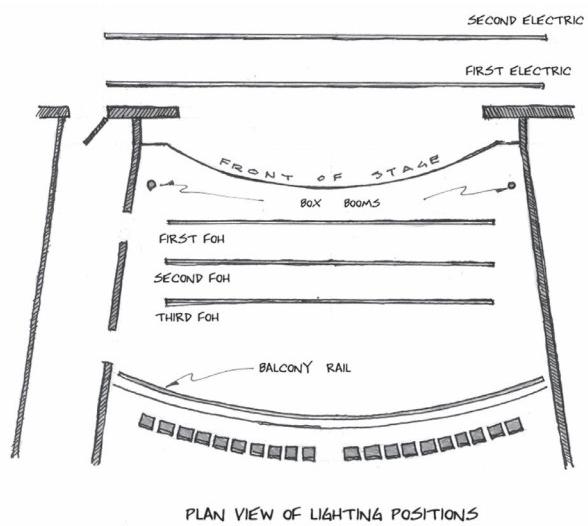
LIGHTING AND SOUND

Many mid-century theatres have a room for lighting and sound in the rear of the auditorium called the booth. Many of those sound booths are enclosed in glass to provide a sound barrier from the auditorium, which was an idea that pre-dated modern sound reinforcement methods. In modern times that just won't work. In one of those theatres the sound console is usually set up in an area cleared of seats in the rear of the auditorium when

live mixing of voice and orchestra is called for. Some newer theatres have a permanent *house mix position*, which is by far the best option.

Overhead lighting pipes located in the auditorium of a theatre are known as front-of-house or *FOH positions*. These positions may be laid out in many various ways, depending mostly on the how the theatre was constructed. FOH pipes may be concealed in soffits, rigged on trusses lowered by chain motors, or may simply be exposed pipes reachable only by a ladder. Front-of-house positions in a newer space are often numbered in relation to their proximity to the stage. The pipe closest to the stage is the first FOH. The next closest will be the second, and so forth. In some theatres one or more of the FOH positions may be called a *beam position*.

The *box boom position* is another place to hang lights in the auditorium. Any vertical pipe used to hang lights might be called a boom. But box booms are specifically located where theatre box seats might have been removed. It is an excellent lighting angle for high side lighting across the front of the stage and is a favorite with lighting designers.



There are as many different arrangements of FOH positions as there are theatres that house them. Touring companies that travel with a lighting package usually designate two front-of-house locations, the aforementioned box boom and *balcony rail*. Once in a particular theatre, the design is modified somewhat to accommodate the existing road house positions. Sometimes there is an actual balcony rail, which is a pipe that has been secured to the front edge of the first balcony and is found in virtually every Broadway theatre.

THE STAGE

Many theatres have holes in the stage floor equipped with removable covers. These passages are known as *traps*. Traps are useful for productions that require actors

or props to disappear into the floor. If a theatre doesn't have a trapped floor, but you need the effect anyway, you can use temporary decking to raise the floor level of the setting in order to "invent" the required space. Many modern facilities are constructed with large basements under the stage. This area is also used as a dressing room, green room, and/or passageway to the orchestra pit. Broadway theatres and road houses often have trap rooms that are used to install *automation*, mechanical devices used to move scenery.

The major architectural element of any proscenium theatre is the *fly house*, or tower. Theatre buildings are quite often easy to spot on a college campus because the tower is a large, square, unattractive building with no windows. Older urban theatres were quite often built so that the fly house is off the street in the middle of the block, and were covered on at least one side by another structure. Many of the original Broadway theatres have an entrance on the street that leads backward to the theatre, which is actually at a 90-degree angle to the entrance, so they take up very little street frontage. They are not so easy to spot. Fire laws prevented architects from building offices over a theatre, but that has changed now.



THE FLY TOWER ON THIS NINETEENTH CENTURY THEATRE WAS EXPANDED UPWARD WITH A METAL-CLAD ADDITION

On the interior, a fly tower is a large open space, very tall, with a *loft* space above. The floor of the loft is a series of beams with spaces in between and is known as a *grid*. The loft space is used for housing rigging equipment. That equipment is covered in detail in the chapter on theatre rigging. In some theatres the rigging is *underhung* from beams in the ceiling in order to save on cost, but this can lead to some serious problems in reaching the equipment when servicing is required.